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Audio Systems

Model: F01/F02

Production: From Start of Production

OBJECTIVES

After completion of this module you will be able to:

- Describe the Audio System on the F01/F02
- Identify the components of the Audio System on the F01/F02
- Describe the CIC system and its relation to the Audio System of the F01/F02
- Identify the components of the CIC system

Introduction

History

With the launch of the E65, an optical bus (MOST) was used for the first time in a series production vehicle for the purpose of transmitting digitized audio signals.

With the introduction of the E93 in 2007 a USB interface for external audio devices was offered for the first time in BMW vehicles. The media can be accessed from the iDrive and the audio data played through the vehicle speakers.

New Features

The CIC system is a further development of the previous CCC system. The CIC head unit was installed for the first time on the BMW 1 Series and 3 Series in 2008. The New BMW 7 Series, the F01/F02 is equipped with an enhanced version of the CIC system.

By storing data on a 80 GB hard disk, the new head unit provides many new functions and options.

In the audio systems, this development is reflected by the new music collection function. Music files can be converted (ripped) or copied for the music collection onto the hard disk.

Storing the music on the CIC-dedicated hard disk allows fast access to these music files at all times.

A selection of up to 3700 music files (12 GB) is possible.

A USB interface is provided in the glove compartment for import/export purposes (data copy or data backup).

The digital radio systems IBOC tuner/decoder is now integrated in the CIC.

A common station list together with the analog systems provides added convenience.

An improved antenna system makes reception of the radio stations even more stable and less prone to interference. An additional interference suppression filter enhances the reception over long distances, particularly in the AM range.

A modified base plate makes it possible to connect to and play back music tracks stored in the mobile phone with the Smartphone Integration option (6NF). This option is currently available only with the iPhone®.

Music tracks stored in the mobile phone can now be easily accessed. Simple menu navigation and playback of these music tracks can now be controlled via the iDrive.

System Overview

General Information

The system overview of the F01/F02 audio system begins with a general bus overview. It shows the interconnection of all IKT components in the bus system network.

A block diagram of the Car Information Computer is also provided.

Particular reference is made to the individual levels within the CIC head unit:

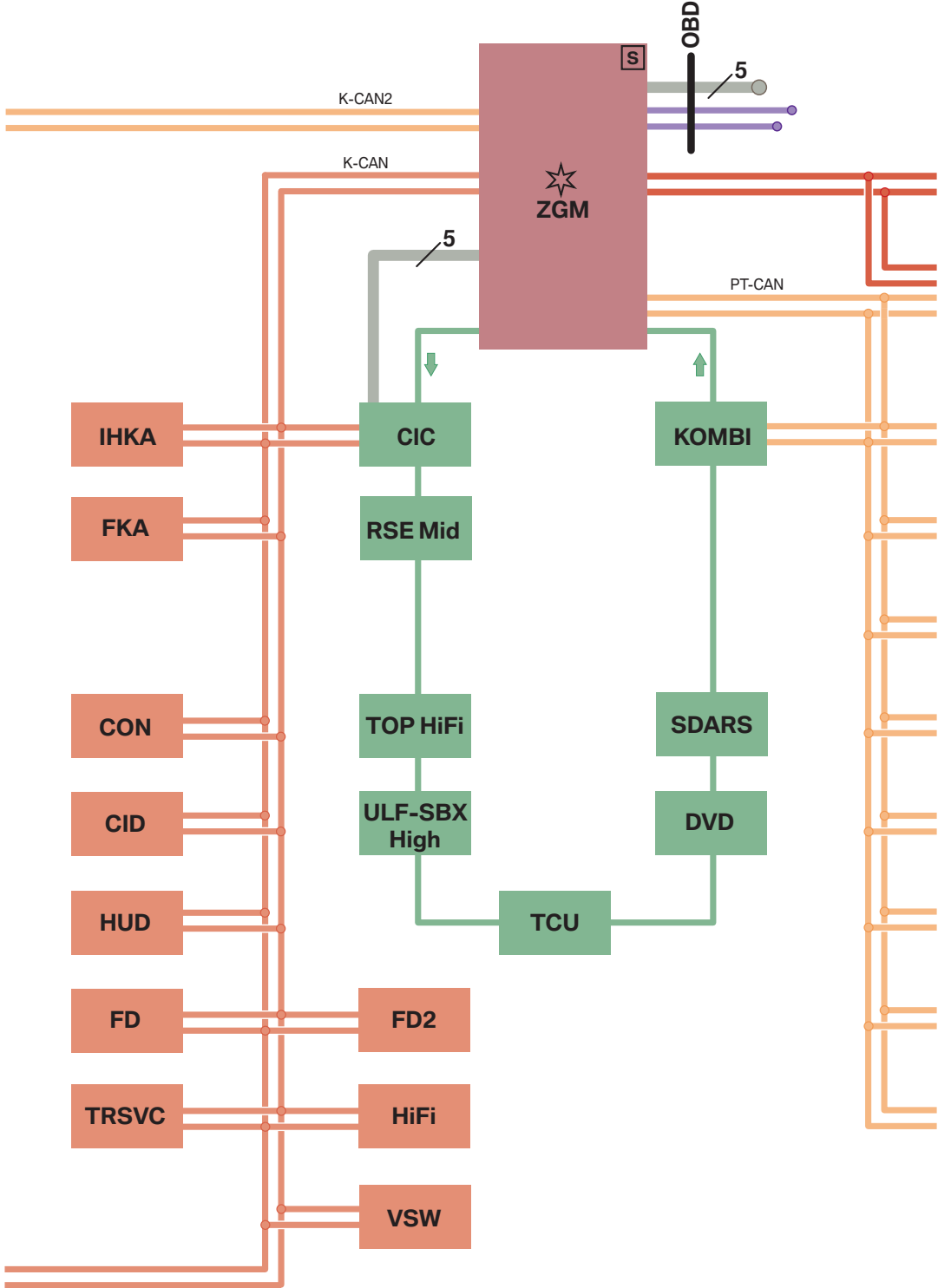
- User interface
- Application software
- Hardware components

Detailed information can be found in the following pages on the individual circuit diagrams:

- CIC Head unit circuit diagram
- HiFi speaker system circuit diagram
- TOP-HiFi speaker system circuit diagram
- Antenna system circuit diagram
- USB/audio interface circuit diagram
- Smartphone Integration circuit diagram
- DVD changer circuit diagram

Note: The Top HiFi System refers to the Premium-HiFi System.

F01/F02 Audio/Bus System Overview



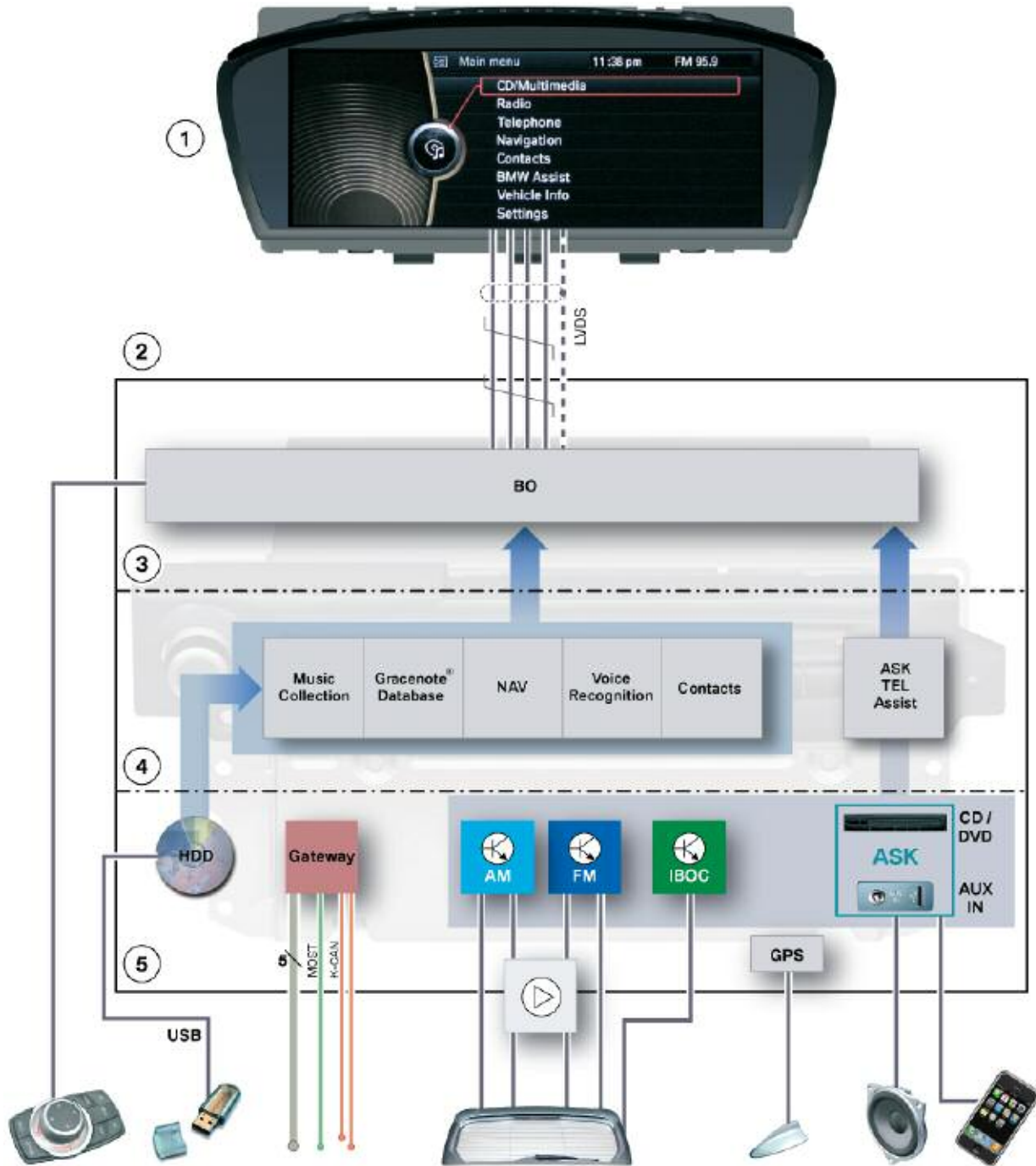
K-CAN	PT-CAN2	Ethernet	MOST
K-CAN2	K-Bus (protokoll)	D-CAN	BSD
PT-CAN	LIN-Bus	FlexRay	Local-CAN

Index	Explanation
CAS	Car Access System
CIC	Car Information Computer
CID	Central information display
CON	Controller
DVD	DVD changer
FD	Rear-seat display
FD2	Rear seat area display 2
HiFi	HiFi amplifier
HKA	Automatic A/C, rear seat compartment
HUD	Head-Up Display
IHKA	Automatic climate control
KOMBI	Instrument cluster
OBD	Diagnosis socket
RSE	Rear Seat Entertainment
SDARS	Satellite tuner
TCU	Telematics control unit
TOP HIFI	Top-HiFi system
SBX High	ULF Interface box "High" (Bluetooth telephone, voice input and USB audio interface)
VSW	Video switch
ZGM	Central gateway module

Key to abbreviations - bus overview

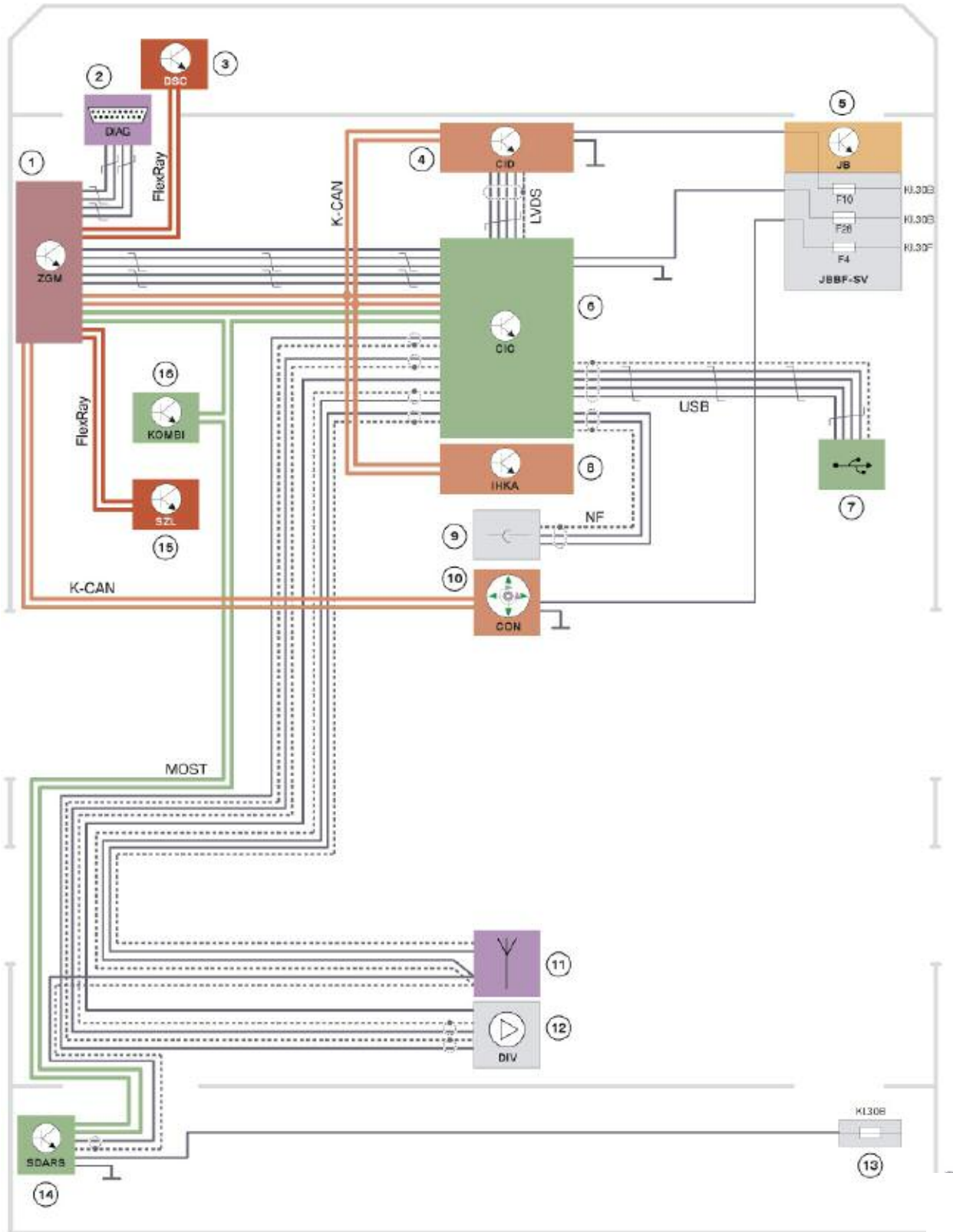
Index	Explanation
D-CAN	Diagnosis CAN
K-CAN	Body CAN
K-CAN 2	Fast body CAN
MOST	Media Orientated System Transport
PT-CAN	Powertrain CAN
PT-CAN 2	Powertrain CAN 2

Block Diagram of Head Unit CIC



Index	Explanation	Index	Explanation
1	Central Information Display (CID)	4	Application software
2	Car Information Computer	5	Hardware and interfaces
3	User interface application		

CIC Head Unit Circuit Diagram



Index	Explanation	Index	Explanation
1	Central gateway module	12	Antenna amplifier with diversity
2	Diagnosis interface	13	Rear power distribution box
3	Dynamic stability control	14	SDARS satellite radio tuner
4	Central information display	15	Steering column switch cluster
5	Junction box electronics module with power distribution box	16	Instrument cluster
6	Car Information Computer	LVDS	Low voltage differential signalling
7	USB port in glove compartment	MOST	Media Orientated System Transport
8	Automatic climate control	USB	Universal serial bus
9	AUX-In connection in center console (jack plug)	FlexRay	FlexRay bus system
10	Controller	K-CAN	Body CAN
11	Roof antenna		

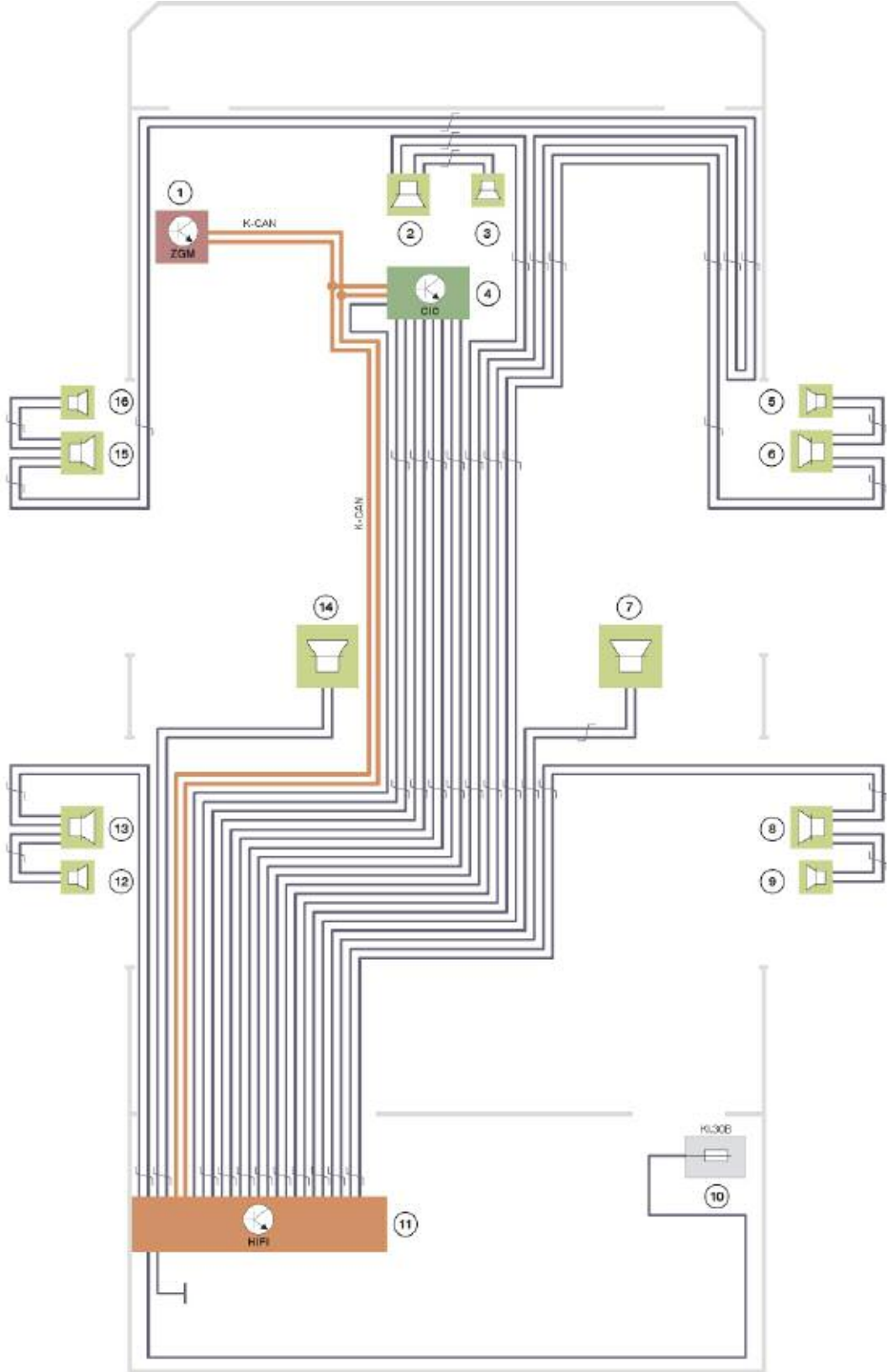
K-CAN signals at the CIC control unit, that are not defined in the system circuit diagram:

In/Out	Signal	Source/sink	Function
In	Speed signal	Wheel speed sensor > DSC > ICM > ZGM >	Speed-dependent volume control
In	Terminal status	CAS > ZGM >	Terminal control
In	Timer bus signal	Instrument cluster > ZGM >	Transfer of ambient conditions
In	Control	CON > ZGM >	User interface control
In	Kl. 58g	Light switch > FRM > ZGM	Button lighting/instrument lighting
Out	Rad_on signal	> ZGM > HiFi amplifier	Rad_on signal for HiFi amplifier

MOST signals at the CIC control unit, that are not defined in the system circuit diagram:

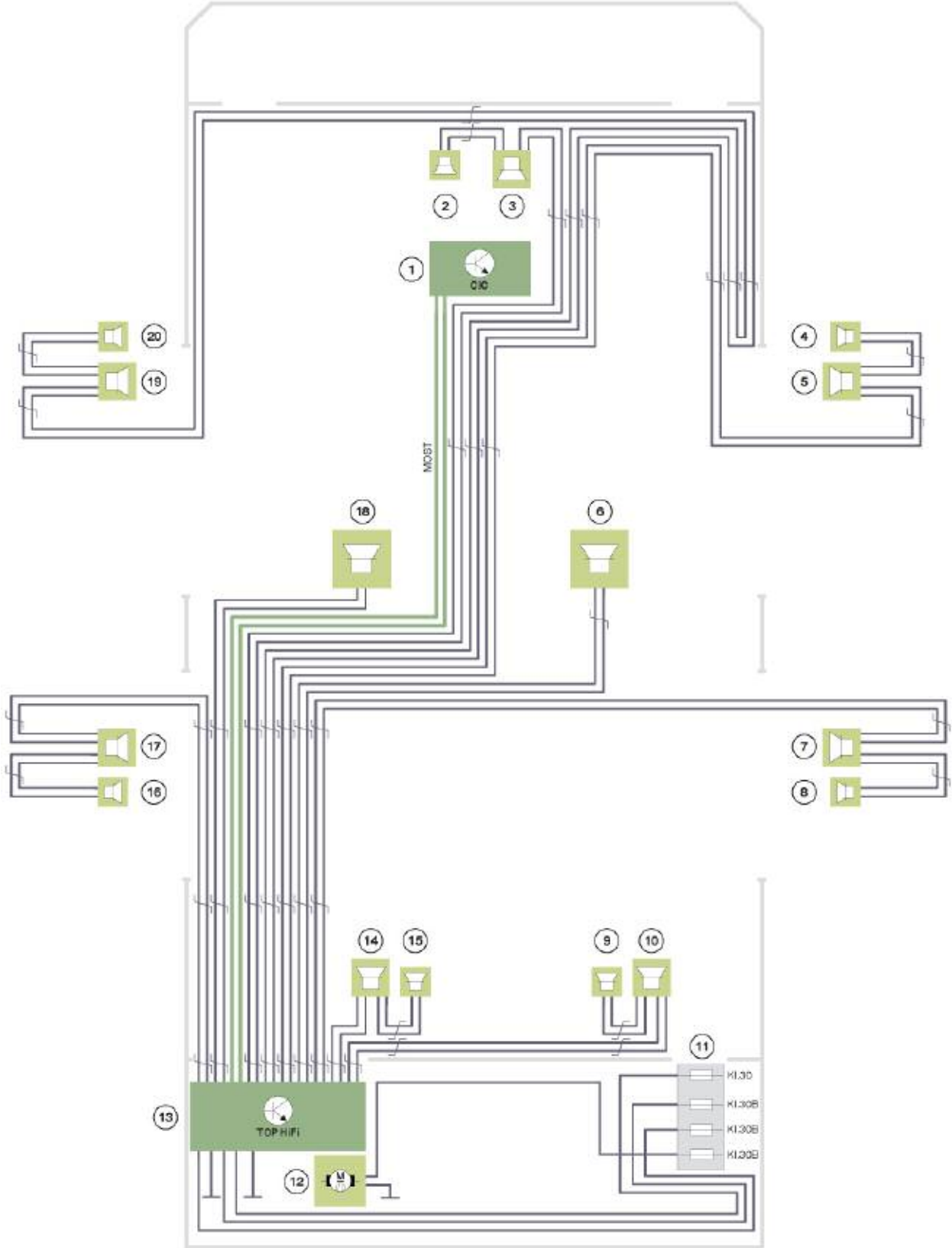
In/Out	Signal	Source/sink	Function
In	Decoded audio signals	DVD changer >	Speed-dependent volume control
In	Information	DVD changer >	Metadata (ID3 tags)
In	Date, time, language	Instrument cluster > ZGM >	Transfer of ambient conditions
In	Kl. 58g	Light switch > FRM > ZGM >	Button lighting/instrument lighting
In	Data, audio signal	ULB-SBX >	Data, audio signal, USB interface, Center console
In	Data, audio signal	ULB-SBX >	Data, audio signal, mobile phone in snap-in adapter
Out	Rad_on signal	> Top-HiFi amplifier	Rad_on activation signal for Top-HiFi amplifier
Out	Audio signals	>Top-HiFi	Audio signals (subsequently converted in Top-HiFi amplifier and output to individual speakers)

HiFi Speaker System Circuit Diagram



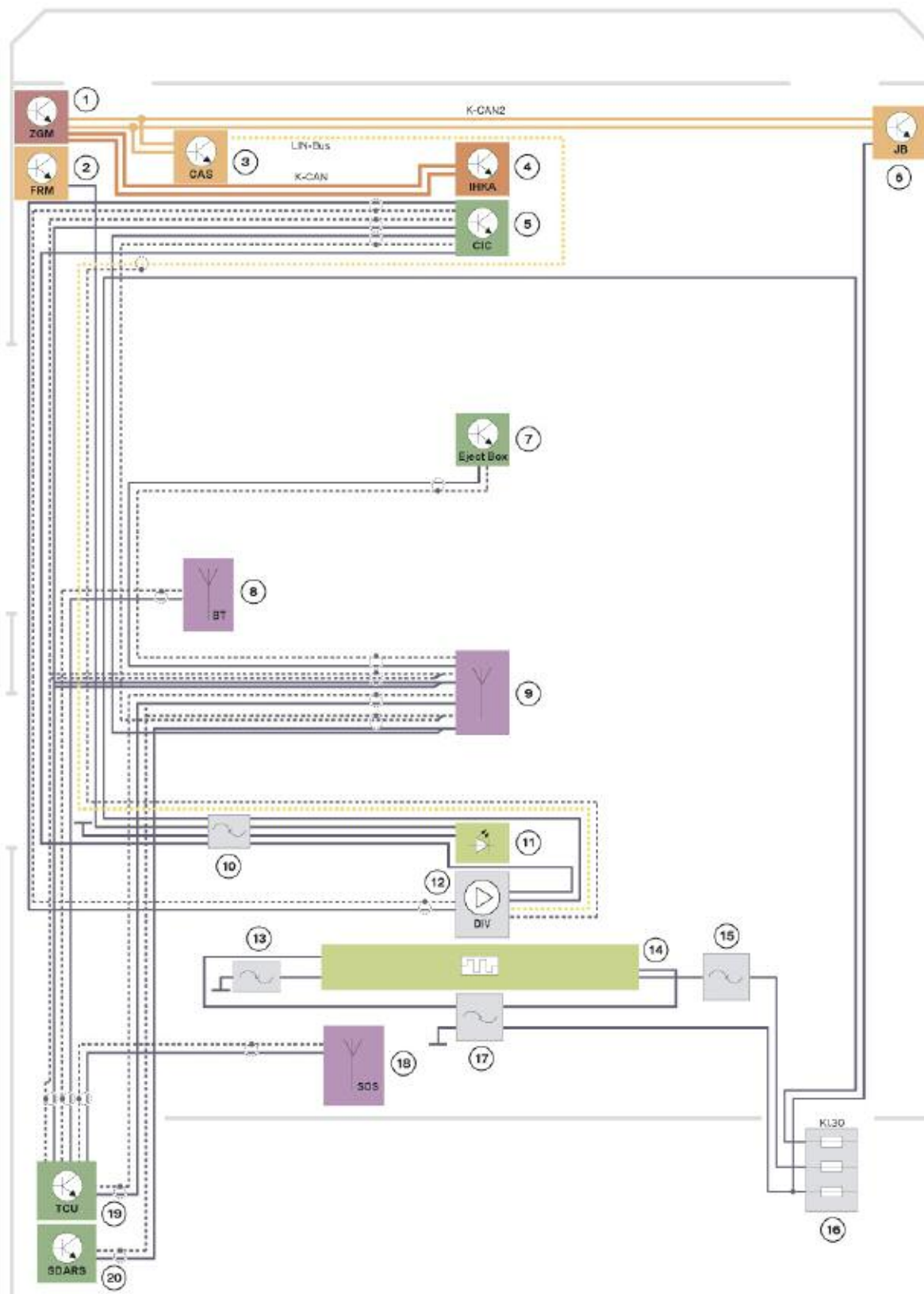
Index	Explanation	Index	Explanation
1	Central gateway module	10	Rear power distribution box
2	Mid-range speaker, front center	11	HiFi amplifier
3	Tweeter, front center	12	Tweeter, rear window shelf, left
4	Car Information Computer	13	Mid-range speaker, rear window shelf, left
5	Tweeter, front right door	14	Woofers, under left front seat
6	Mid-range speaker, front right door	15	Mid-range speaker, front left door
7	Woofers, under right front seat	16	Tweeter, front left door
8	Mid-range speaker, rear window shelf, right	K-CAN	Body CAN
9	Tweeter, rear window shelf, right		

TOP-HiFi Speaker System Circuit Diagram



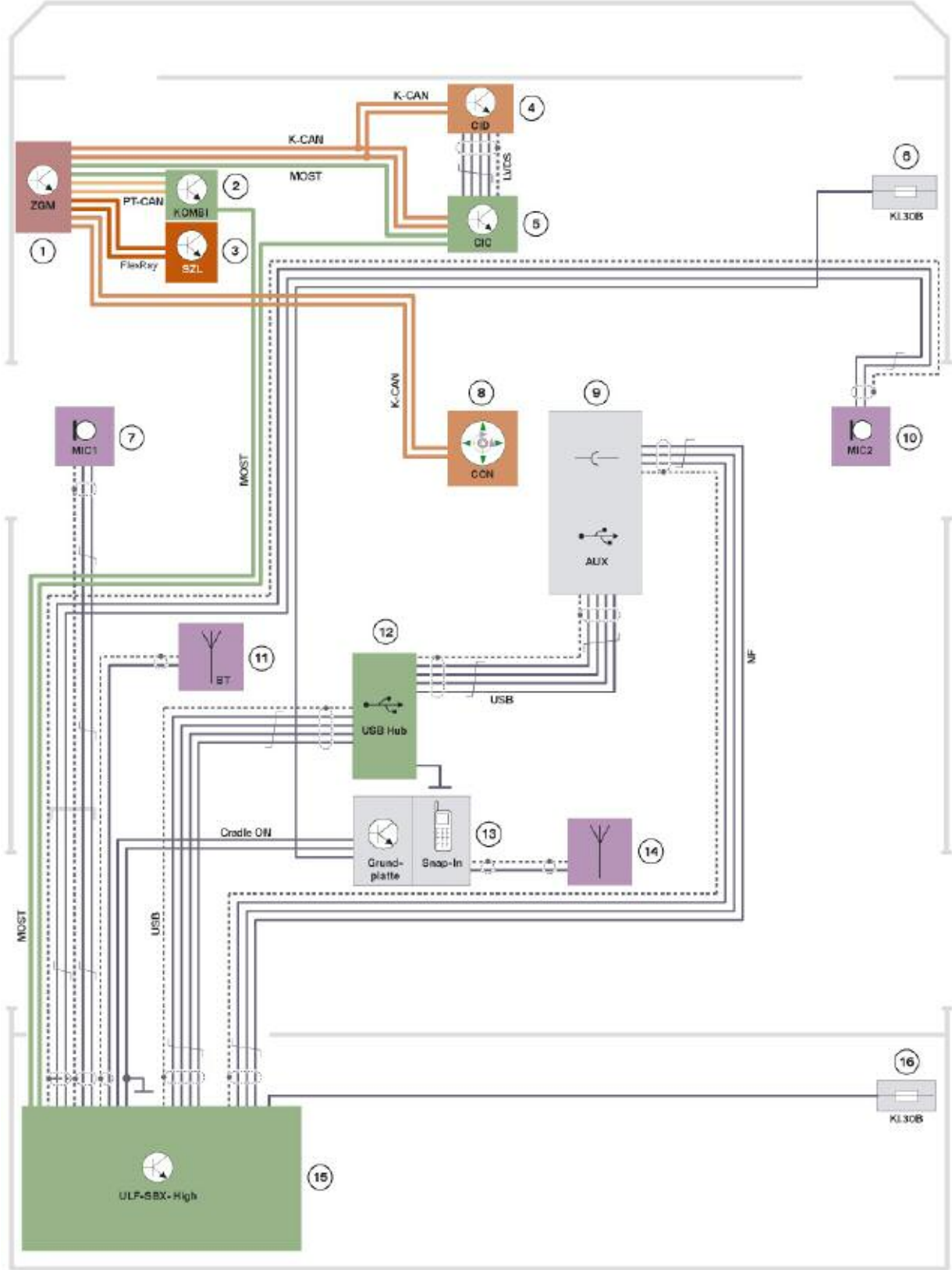
Index	Explanation	Index	Explanation
1	Car Information Computer	12	Axial-flow fan, TOP-HiFi amplifier
2	Tweeter, front center	13	Top-HiFi amplifier
3	Mid-range speaker, front center	14	Mid-range speaker, rear window shelf, left
4	Tweeter, front right door	15	Tweeter, rear window shelf, left
5	Mid-range speaker, front right door	16	Tweeter, rear left door
6	Woofer, under right front seat	17	Mid-range speaker, rear left door
7	Mid-range speaker, rear right door	18	Woofer, under left front seat
8	Tweeter, rear right door	19	Mid-range speaker, front left door
9	Tweeter, rear window shelf, right	20	Tweeter, front left door
10	Mid-range speaker, rear window shelf, right	MOST	Media Orientated System Transport
11	Rear power distribution box		

Antenna System Circuit Diagram



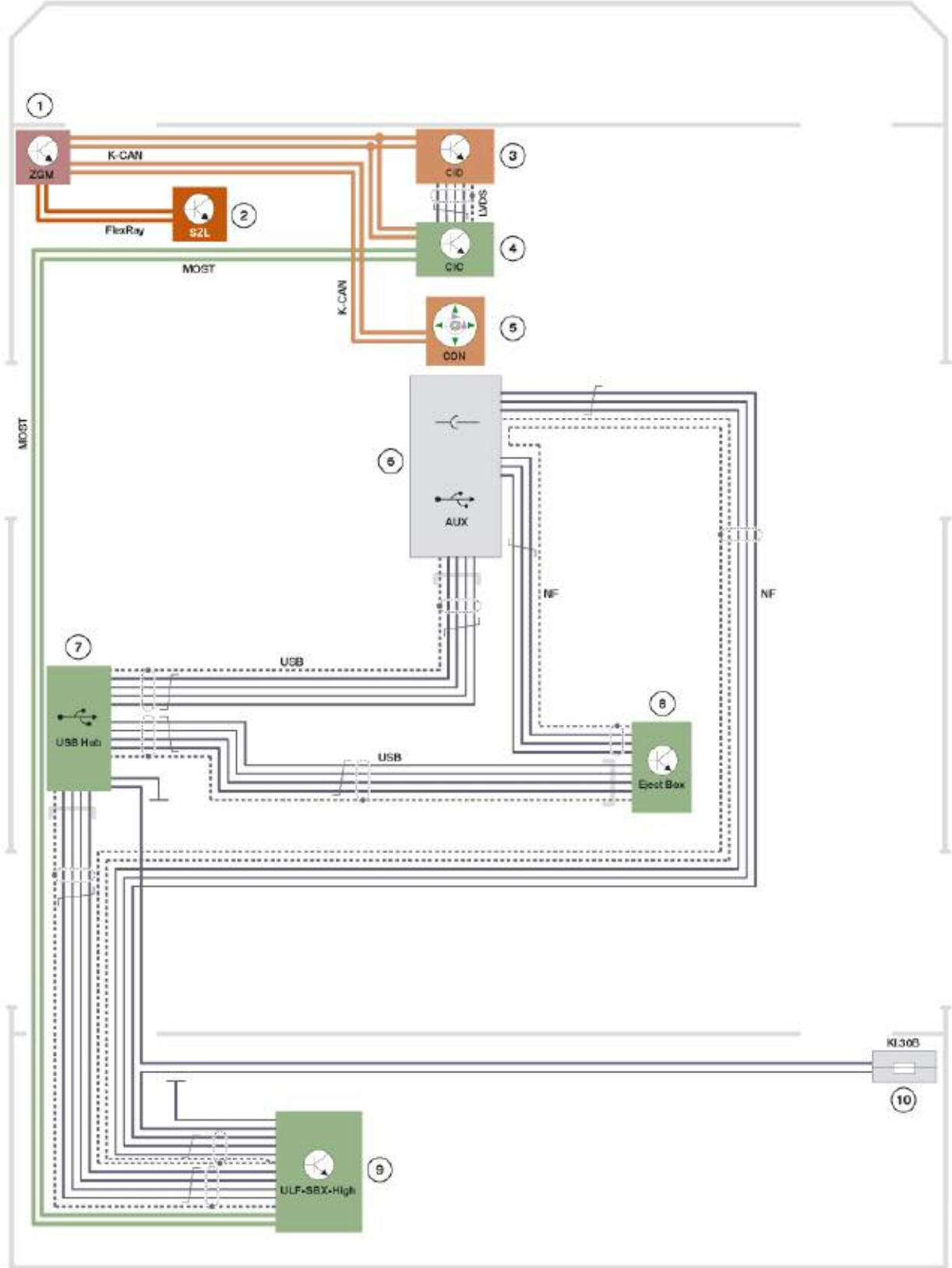
Index	Explanation	Index	Explanation
1	Central gateway module	13	Rejector circuit, rear window defogger_1
2	Footwell module	14	Rear window with individual FM/ AM antenna
3	Car Access System	15	Rejector circuit, rear window defogger_2
4	Automatic climate control	16	Rear power distribution box
5	Car Information Computer	17	Rejector circuit, rear window defogger for AM range
6	Junction box electronics	18	Emergency call antenna (backup)
7	Base plate of universal charging and hands-free (Not for US)	19	Telematics control unit
8	Bluetooth antenna	20	SDARS satellite tuner
9	Roof antenna	K-CAN	Body CAN
10	Interference suppressor filter, rear brake light	K-CAN 2	Fast body CAN
11	Rear brake light	LIN	Local Interconnect Network
12	Antenna diversity		

USB/audio Interface Option Circuit Diagram



Index	Explanation	Index	Explanation
1	Central gateway module	12	USB hub
2	Instrument cluster	13	Not for US
3	Steering column switch cluster	14	Roof antenna
4	Central information display	15	ULF-SBX-High (6FL)
5	Car Information Computer	16	Rear power distribution box
6	Junction box	K-CAN	Body CAN
7	Microphone, left side of vehicle	PT-CAN	Powertrain CAN
8	Controller	FlexRay	FlexRay bus system
9	AUX-In connection combined for USB connection + jack plug	MOST	Media Orientated System Transport
10	Microphone, right side of vehicle	LVDS	Low voltage differential signal
11	Bluetooth antenna		
12	Antenna diversity		

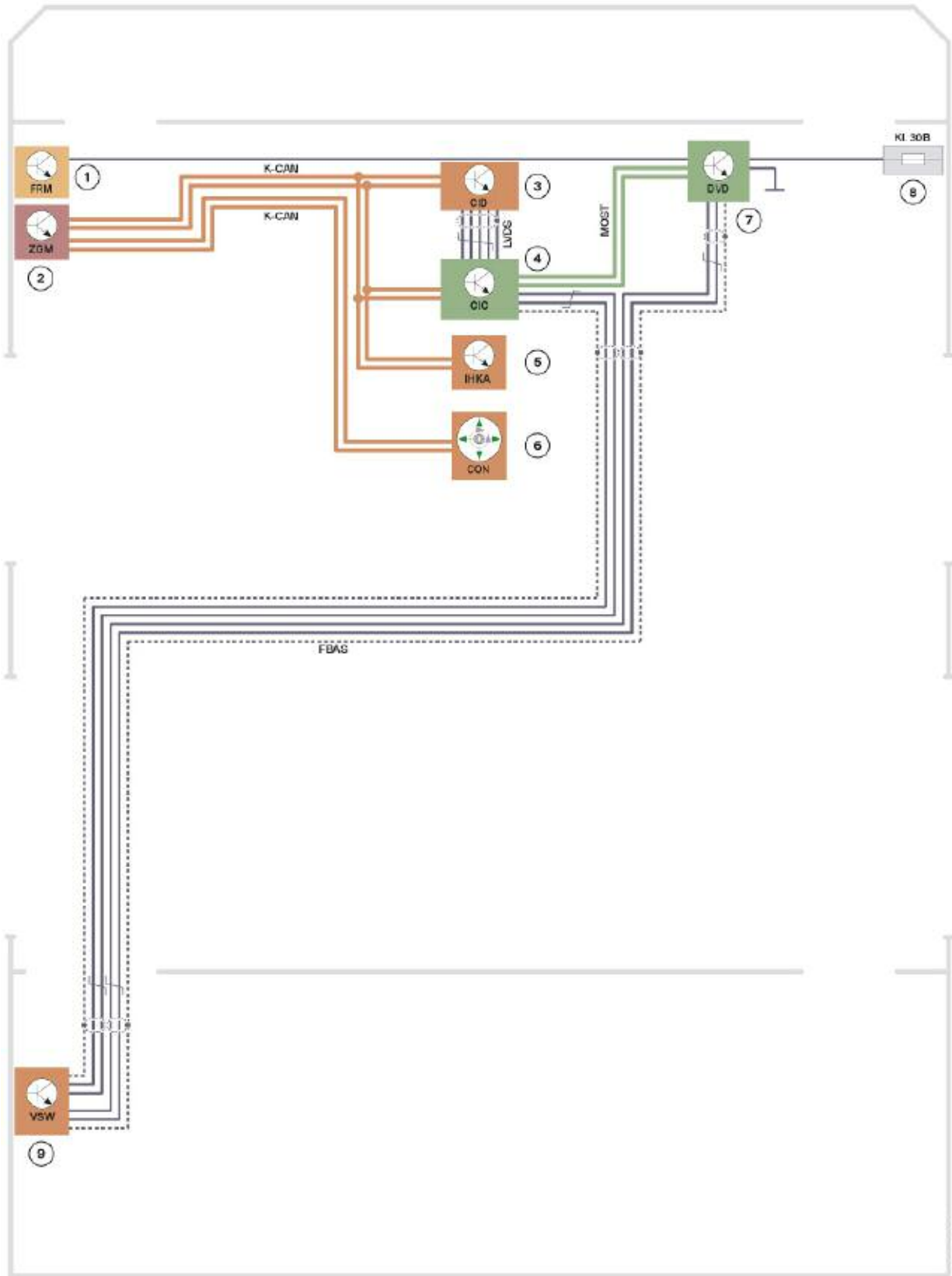
Smartphone Integration Option Circuit Diagram



Index	Explanation	Index	Explanation
1	Central Gateway Module	9	ULF-SBX-High (6FL)
2	Steering column switch cluster	10	Rear power distribution box
3	Central Information Display	K-CAN	Body CAN
4	Car Information Computer	K-CAN 2	Fast body CAN
5	Controller	FlexRay	FlexRay bus system
6	AUX-In connection combined for USB connection + jack plug	MOST	Media Orientated System Transport
7	USB hub	LVDS	Low voltage differential signal
8	Base plate of universal charging and hands-free (Not for US)		

Note: Smartphone Integration uses a cradle to connect and play music stored in a mobile phone. Currently this feature is only available with the Apple iPhone®.

DVD Changer Circuit Diagram



Index	Explanation	Index	Explanation
1	Footwell Module	8	Junction box
2	Central Gateway Module	9	Video switch
3	Central Information Display	K-CAN	Body CAN
4	Car Information Computer	K-CAN 2	Fast body CAN
5	Automatic climate control	FlexRay	FlexRay bus system
6	Controller	MOST	Media Orientated System Transport
7	DVD changer	LVDS	Low voltage differential signal

Principals of Operation

Comparison of CIC with CCC

The ASK system was installed in E65/E66. With the E60, ASK developed into M-ASK and the further developed CCC which was available as an option.

The multi-audio system controller M-ASK is the central control unit of the information and communications systems. The M-ASK combines up to four control units in one.

The M-ASK combines the following control units in one housing:

- ASK
- Antennal amplifier/tuner
- MOST CAN gateway, interface to control display

In the E65, these modules were separate control units.

The car communication computer CCC is the central control unit which combines the functions of the M-ASK, plus some additional functions.

Voice control of the systems and the navigation system with map presentation were made possible with the CCC.

The CCC also contains the driver for the rear passenger compartment display.

The CCC performs all the functions of the M-ASK as well as offering Navigation and additional programming possibilities.

As part of this development from the ASK to the CCC system, the radio tuner, navigation, voice recognition and actuation as well as video signal processing were integrated in the CCC.

A comparison is repeatedly made in this training information between the predecessor, Car Communication Computer head unit and the new CIC head unit.

Note: For further information on the CIC refer to the Vehicle Owner's Manual and the CIC training material available in TIS and ICP.

The following table shows a comparison between the previous menu items of the CCC (bold print) and the menu items of the CIC (bold print).

CCC main menu		CIC main menu
		
Communication	=	Telephone
Telephone		Telephone
A-Z		Telephone/Phonebook
Telephone => Phonebook Navigation => Address Book	=	Contacts (imported/self-entered contacts)
Communication	=	BMW Services
Assist services		BMW Services
Navigation	=	Navigation
Navigation, onboard information, BC	=	Vehicle information , onboard computer
Air conditioning (climate control)	=	Settings (limited)
Entertainment	=	CD/Multimedia
CD, DVD, CDC		CD/DVD
Radio (FM, AM, IBOC)	=	Radio (FM, AM, IBOC)
Not available		Music collection (on hard disk)
Settings (5th menu)	=	Settings
Audio		Sound
Display screen		Central screen
Time/Date		Time/Date
Language		Language/Units
Vehicle/Tires	=	Vehicle information /Vehicle status
Service	=	Vehicle information /Vehicle status
Vehicle Owner's Manual only paper form	=	Vehicle Owner's Manual (Dital Form)

The star-shaped operating concept of “**Turn-Press-Push**” of the CCC has been further developed in the CIC.

The sub-menus in the main menu now are arranged in lists.

All listed sub-menus can be accessed in the start menu by “**turning**” and “**pressing**” the controller.

Several sub-menus can now also be selected by means of the direct access buttons on the controller.

The windows of the selected submenus are placed horizontally one over the other.

Display

The display used for the Car Information Computer is the same CID (Central Information Display) known from the CCC.

In the F01/F02, the screen size has increased to a diagonal of 10.2" (26cm).

The number of pixels has doubled in the CID from 640x240 pixels for the CCC display to 1280x480 pixels in the CIC central display.

The new display delivers a crisp and improved picture quality compared to the previous system.

The graphic layout of the user interface has been totally redesigned.

The rear view of the F01/F02 control display is shown in the following with the two connections.



Front view of control display F01/F02



Rear view of control display F01/F02

Index	Explanation	Index	Explanation
1	Connection 2-wire LVDS input signal, connector color: Bordeaux red	2	Connector power supply, K-CAN connector color: Black

Controller

The second most important hardware component of the BMW iDrive system is the controller.

The new controller has been completely redesigned compared to the CCC controller.

The most noticeable new feature of the CIC controller are the seven direct access buttons.

It is now possible to access the following menus directly:

- Main menu
- CD/Multimedia
- Radio
- Navigation
- Telephone

The following menus can still only be selected from the main menu, i.e. with no direct access:

- Contacts
- BMW Services
- Vehicle information
- Settings

The “Back” button is pressed to go back to the last display view. Up to 30 “back” steps are possible with this button.

The option button makes it possible to make fine adjustments or carry out special functions in the sub-menu last selected.

The direct access buttons replace the “long push” function. With this function it was possible to change from a sub-menu directly to another sub-menu in the CCC by pushing the controller in the corresponding direction for at least two seconds.

The respective sub-menus are now selected directly by pressing the CD/multimedia, radio, navigation or telephone buttons twice.

Controller of the CIC



Index	Explanation	Index	Explanation
1	Direct access button for Main menu	5	Direct access button for Options sub-menu
2	Direct access button for CD/Multimedia	6	Direct access button for Navigation
3	Direct access button for Radio	7	Direct access button for Telephone
4	Direct access button to go Back		

CD/Multimedia

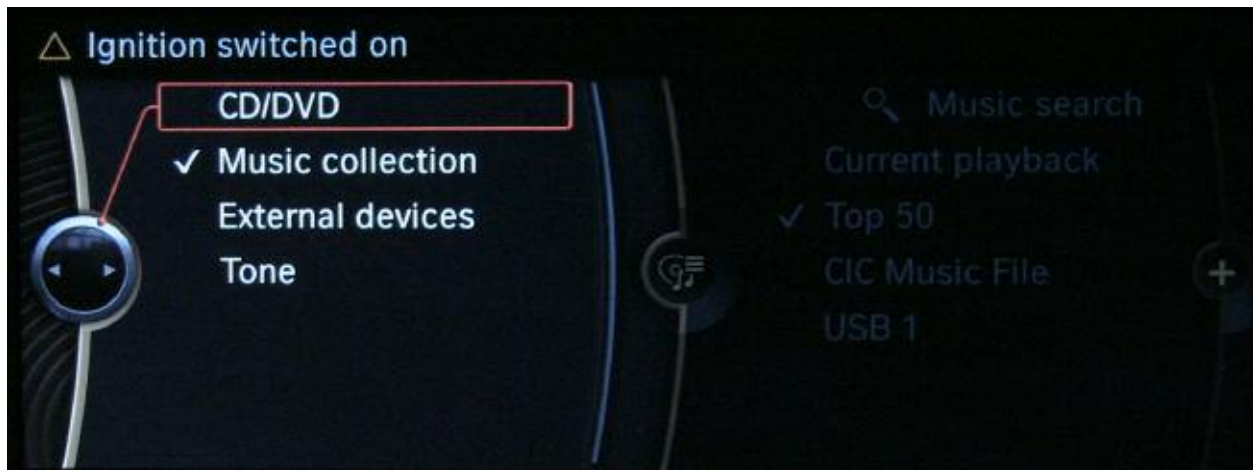
In terms of their functionality, the CD/DVD, external devices and sound submenus located under CD/Multimedia are similarly configured as the iDrive “Entertainment” menu of the CCC.

This training material mainly deals with the **Music collection** selection menu. The other selection menus are described in detail in the Vehicle Owner’s Manual.

With the music collection, it is possible to store music data within the CIC on an 80GB hard disk. A total of 12 GB is reserved for the music collection, corresponding to about 3700 music tracks.

A **music search** function has been implemented, which searches for information (metadata) on the individual music tracks (artist, album, etc.).

A music track database (Gracenote®) provides further information to the music track (metadata). This takes place as a supplementary function to the conversion process from Digital Audio CD to a WMA file. A storage space of 4 GB is reserved for this purpose on the CIC-internal hard disk.



CD/Multimedia sub-menu with “Music collection” checked

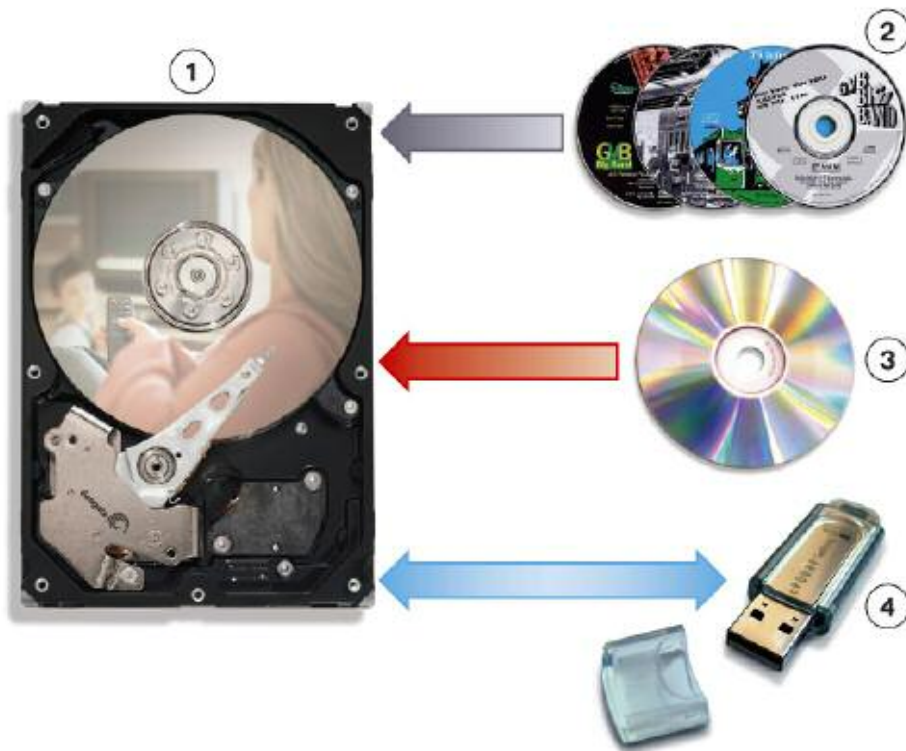
Storing Music Data on the HDD

The music collection is stored in a partition on the internal hard disk drive (HDD) of the CIC. This device makes it possible to store a large selection of music data in the vehicle, while allowing the option to retrieve it when necessary.

Up to 12GB of the total 80 GB hard drive is set aside for the music collection.

The following three options can be used to store music data on the hard disk:

- Rip function from Compact Disk Audio format
- Copying data via the CD/DVD drive
- Copying data from the USB



Index	Explanation	Index	Explanation
1	Hard disk (HDD)	3	DVD/CD ROM with compressed audio data (WMA, CDA, MP3, AAC)
2	Commercially available audio CDs (Compact Disk Digital Audio CDA)	4	USB stick

■ Rip Function

This function rips commercially available audio CDs (marked with the Compact Disk Digital Audio logo) and converts them to compressed music files.



This function can be performed when the vehicle is stationary or while driving.

The music on the CD can also be played back during the conversion and storage process of the rip function.

The music data is converted at a speed between 3 and 12 times the playback speed. Following the conversion the music data is stored on the hard disk in WMA file format.

The data is then displayed in the form of file folders in the music collection menu. These folders are identified with the corresponding title and with a round CD icon.

After the conversion process the files will be displayed and can now be selected individually by using the music search function.



Start of rip function for a loaded Digital Audio CD



Music data (WMA) of a Digital Audio CD stored in the music collection

■ Copying Data via the CD/DVD Drive

Self-recorded CD/DVD ROMs with audio files in MP3, WMA or AAC (M4A) format can be read, copied and stored using the DVD player (drive).

All CD/DVD formats (from CD-R to DVD Double Layer) are supported, except for CD-RAM and DVD-RAM.

The audio data is then stored in the form of file folders in the music collection together with the title of the respective CD/DVD ROM.

If the CD/DVD ROMs are untitled, they will be stored as "Audio-CD 1", "Audio-CD 2", etc. To facilitate identification, a folder icon is shown next to the file folder.



Copying a music file from a CD-ROM

■ Copying Data from the USB

Data contained on a USB stick (music files in MP3, WMA or AAC format) can be imported via the import/export USB port located in the glove compartment.

Copying music data from audio devices such as an MP3 players or iPods using the USB connection is possible although not advisable.

The folder and file structure of the player are also copied when copying music files from an audio player (MP3 player, iPod®). In this case, the copied folder names are represented by means of cryptic characters instead of an album title. This makes a subsequent search for a music file virtually impossible.



Copying USB music file using the import/export music feature



USB Import/export interface in glove compartment of the F01/F02

The imported USB music data is stored in file folders with USB 1, USB 2 etc. in the music collection. These folders are also shown together with a folder icon as the files copied through the DVD drive.



Copied USB1 folder Stored in the Music Collection Menu

Compatible USB sticks must be FAT formatted and must support the Mass Storage Class USB protocol. The format can be easily checked on any PC running the Windows operating system.

The file system (FAT 16, FAT 32 or NTFS) is shown under properties of the USB stick in the Windows Explorer. The protocol which is used is shown by clicking the hardware icon in the windows information area.

When using a USB stick device with several partitions, the music data files must be located in the first partition in order to be recognized and processed.

USB hard drives, USB hubs and USB memory card readers with several slots cannot be read when connected to the USB jack in the glove compartment and therefore can not be used.

Depending on the USB lead used, the mass storage device may be able to be charged through the USB interface. However, the power consumption of the mass storage device must not exceed the maximum level of 500 mA permitted.

It is recommended that when charging a storage device, only the USB audio interface in the center console be used and not the USB in the glove compartment.

Note: The USB interface in the glove compartment is only intended for the import and export of data (music or personal profiles) to and from the vehicle.

File System

The folders of the converted or copied music files can subsequently be renamed in the “Options” menu.

For this purpose, the corresponding album entry must be marked in the music collection and then the “Options” menu selected.

It is important to note the following when copying music files with Digital Rights Management (DRM) protection to the music collection:

- AAC music data in the M4P format (P = Protected) cannot be copied to the hard disk.
- Only music data in WMA format with copy protection can be copied.

This data will be shown in the music collection and in the music search. However, these protected tracks **cannot** be played. The track will be “skipped” or ignored and a different non-protected music track will be played.

The reason for this is that it is not possible to provide purchaser authentication in the CIC because a link to the online provider cannot be established. It is suggested that the customer import the audio files using a self recorded Digital Audio CD.

All music download portals allow the creation of a Digital Audio CD for the downloaded music track. However, the number of copies that can be created is limited by licensing legislation.

Data Saving (Backup)

The customer has the option of saving his/her complete music collection under the "Options" sub-menu. This is achieved by copying it back to a USB stick installed in the glove box port. It is necessary to ensure that the USB stick has sufficient storage capacity. A maximum storage capacity of 12 GB is required for saving the music collection data.



Import/export submenu screen shot showing how to back up music files

The process is similar to the data saving procedure on a PC. This function makes it possible to import data when changing vehicles or when replacing a head unit or hard disk.

Data saving will only be possible if the hard disk of the CIC has not been damaged and the interfaces to the CIC are still fully operational.

Data back up should be done prior to programming the vehicle after replacing control units. Without data saving (backup), all of the music data could be lost. However, this can only be done by the customer prior to bringing the vehicle in for service. Detailed instructions on how and where the data backup can be performed are provided in the Vehicle Owner's Manual.

WARNING!!!

For copyright reasons, the service personnel are not permitted to perform the data backup for the customer. The service personnel, can, however, instruct the customer on how to perform the backup procedure.

Music Search

The "Music search" sub-menu is provided in the music collection for the purpose of managing a large quantity of music files.

The music search takes place in accordance with a special filtering process. The search can be started at any menu item in the music search. For example, if the menu item "Genre" is selected as the starting point, all albums of all artists together with all the tracks in this music direction will be made available for selection.

In the next step, only the artist is selected and all his/her albums are displayed.

The search is now filtered further with each step until at the end, only the required entry remains.

The information for the music search is stored in the form of a metafile, similar to the ID3 tags of an MP3 file.

An example of how these metafile or meta information could appear is shown below:

Music search	Search for:	Example
1	Genre	Rock
2	Artist	Queen
3	Album	Greatest Hits II
4	Track	A Kind Of Magic



Music collection menu with a stored album selected



“Genre” selected in the Music Search sub menu

Data management is achieved with the aid of a music track database.

The music track database information is stored on the hard disk of the CIC for the purpose of managing the music file’s metadata. A 4 GB partition is allocated to the music search function.

The CIC is equipped with special software provided by Gracenote® for the purpose of identifying the complete albums of ripped Digital Audio CDs. It provides additional information about the music track on the respective Digital Audio CD converted to WMA files.

This music track database (Gracenote®) uses TOC (Table of Contents) as the identification pattern. This means, complete albums on Digital Audio CDs are identified based on the number of tracks and the track length.

The corresponding data (track, artist, etc.) is then accordingly assigned to the music files in the music search database.

On conclusion of the conversion procedure to WMA files, the new metadata is automatically added to the directory structure in the music search. It is not possible to rename or edit this metadata after it is in the hard disk.

Note: Albums with newly released metadata at the time of vehicle delivery will no longer be identified. The music track database would require a permanent link with the server in order to keep this data up to date and this is not possible.

Unrecognized metadata of Digital Audio CDs is stored in the music collection as "Audio-CD 1", "Audio- CD 2", etc., together with the CD icon.

The metadata for the music track database from copied CD/DVD-ROMs or USB sticks is adopted identically in the music search function. This metadata does not stem from the music track database but rather from the user/customer himself.

The metadata, copied from a USB stick or CD/DVD ROM, cannot be renamed in the CIC.

In order to correct the faulty metadata on a track or file, the file must first be deleted from the hard disk in the CIC.

The user can then rename or add to these metadata files corresponding to the music track database structure (genre, artist, album and track) by using software on a personal computer.

When the file is imported back into the CIC hard disk, the correct metafiles will be displayed. This procedure also ensures that the music search will also find the copied music data with the music track, artist, etc.

Updating unknown music tracks is only possible with WMA files from ripped Digital Audio CD. If the user/customer does not follow this procedure, in time the music search will become unusable.

A "current" version of the music track database is stored in the vehicle on delivery. The information about music CDs (Digital Audio CDs) released after the vehicle delivery will not be found in the vehicle's music track database.

Note: If the metadata is not found because the Gracenote database in the CIC is outdated, the tracks will not be recognized.

Updating the (Gracernote®) Database

To keep the entire contents of the music track database (Gracernote®) up to date, BMW Service is equipped with the latest CD of the music track database (Gracernote®).

This update takes place in connection with the media package, which also contains the Gracernote Update CD.

The CD can be loaded directly in the CIC drive and updated via the Service menu of the CIC (See Service Information).

The update of the music track database (Gracernote®) will become effective in the WMA music files only after subsequent conversions (rip function) of Digital Audio CD.

Metadata will no longer be added to files that were ripped before the update of the music track database (Gracernote®).

The reason for this is that the music track database is only accessed when a Digital Audio CD is loaded and subsequently ripped.



Gracernote Update CD

Radio

FM Stations

The layout of the "FM stations" in the Radio menu has been adapted to the new operating concept.

The former layout of the "All stations" list in the form displayed by the CCC has been replaced in the CIC by a list layout.



FM menu "All stations" in CCC



FM menu "All stations" in CIC as list



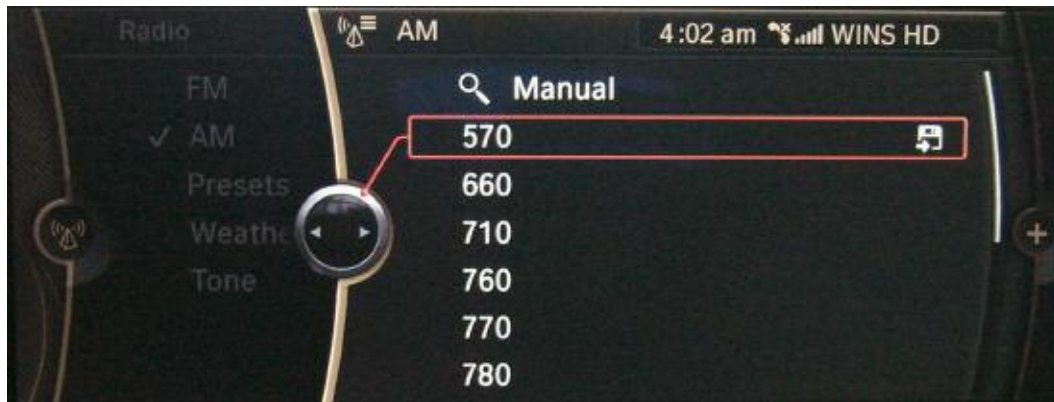
Manual station search in a CCC system



Manual station search in a CIC system

AM Stations

A double tuner has now made it possible to receive the "All stations" list in the AM range. However, no station information can be displayed because the RDS data is not transmitted for AM.



AM stations list



AM stations manual setting

IBOC

The IBOC functions in connection with the IBOC decoder which is now installed inside the CIC. IBOC makes it possible to receive digital radio signals. The IBOC components are described in detail in the "System Components" section of this training material.

SDARS

The Satellite radio service is available with a subscription to Sirius satellite radio. An example of how a station list would look like in the CIC with channels that have not yet been subscribed to is shown in the illustration below.



Station list with SDARS channels still disabled

■ Stored Stations

Under the menu item "Stored stations", the required stations from all frequency ranges can be stored in a common menu and then selected at a later time.

The following frequency bands are available for storage:

- FM
- AM (SW, MW, LW)
- IBOC



Stored stations

Settings Menu

The following settings options can be edited under the Settings submenu:

Head-up display	Brightness, picture position
Central screen	Brightness
Time/Date	Time, date, format
Language/Units	Languages
	Voice dialog: Standard/Short
	Fuel consumption: l/km, km/l, mpg
	Distance: km, mls
	Temperature: °C, F
Sound	Trebles, basses etc.
	Volume adjustment: Speed Volume
	Volume adjustment: Navigation
	Volume adjustment: PDC
	Volume adjustment: Gong
Limit	Setting limit, acceptance limit
Air conditioning (climate control)	Auxiliary heating, auxiliary ventilation
Lights	Home lights
	One-touch indicators
	Daytime driving light
	Welcome light
	High beam assistant
Door locking	Remote control key, lock automatically etc.
Luggage compartment lid	Adjust opening angle



Settings Menu

Favorite Buttons

CIC controller has eight favorite buttons.

The buttons have two operating modes:

- Short press : Activation of button assignments
- Long press: Storage of function currently shown in the CID

The long press function stores:

- The required audio media: Radio stations, CD, DVD player or DVD changer access
- Navigation destinations: However, they must already be stored under “Contacts” or entered from “Last destinations”
- Phone numbers

A new feature is that it is possible to assign all submenus such as “CD/ multimedia” or selection menus such as “Music collection” or “External devices” to the favorite.

System Components

This section describes the audio systems in F01/F02 vehicles.

It is subdivided into the following subsections:

- Head unit, Car Information Computer CIC
- Amplifiers and speakers
- Antennas
- Digital tuners
- Peripherals
 - DVD changer
 - USB/audio interface
 - Smartphone integration option

The new head unit (CIC) replaces the CCC head unit and is standard equipment on the F01/F02.

The IBOC digital tuner is now integrated into the CIC.

The navigation system is also integrated into the CIC. The navigation software and navigation map material are stored on the CIC internal hard disk.

The Car Information Computer can be combined with the following speaker and amplifier systems:

- HiFi system (676)
- TOP-Hifi system (677)

With the F01/F02 the antenna reception has been enhanced.

The satellite tuner “SIRIUS satellite radio” and IBOC digital radio for HD radio reception are optionally available.

A CD changer is no longer offered for the F01/ F02.

The single-slot DVD changer is offered on the F01 and F02. The DVD changer can accept up to six disks. The disks are inserted in the unit without the use of a magazine.

A USB/audio interface is also available as an optional extra. External audio and storage media are incorporated in the vehicle entertainment system via this USB/audio interface.

Devices such as the iPhone® can now be integrated in the vehicle network by means of the Smartphone Integration Option. With the mobile phone cradle it possible to navigate in the device menu and play back selected audio files. Although the device can also be connected with the USB Y-cable it is no longer necessary for this function.

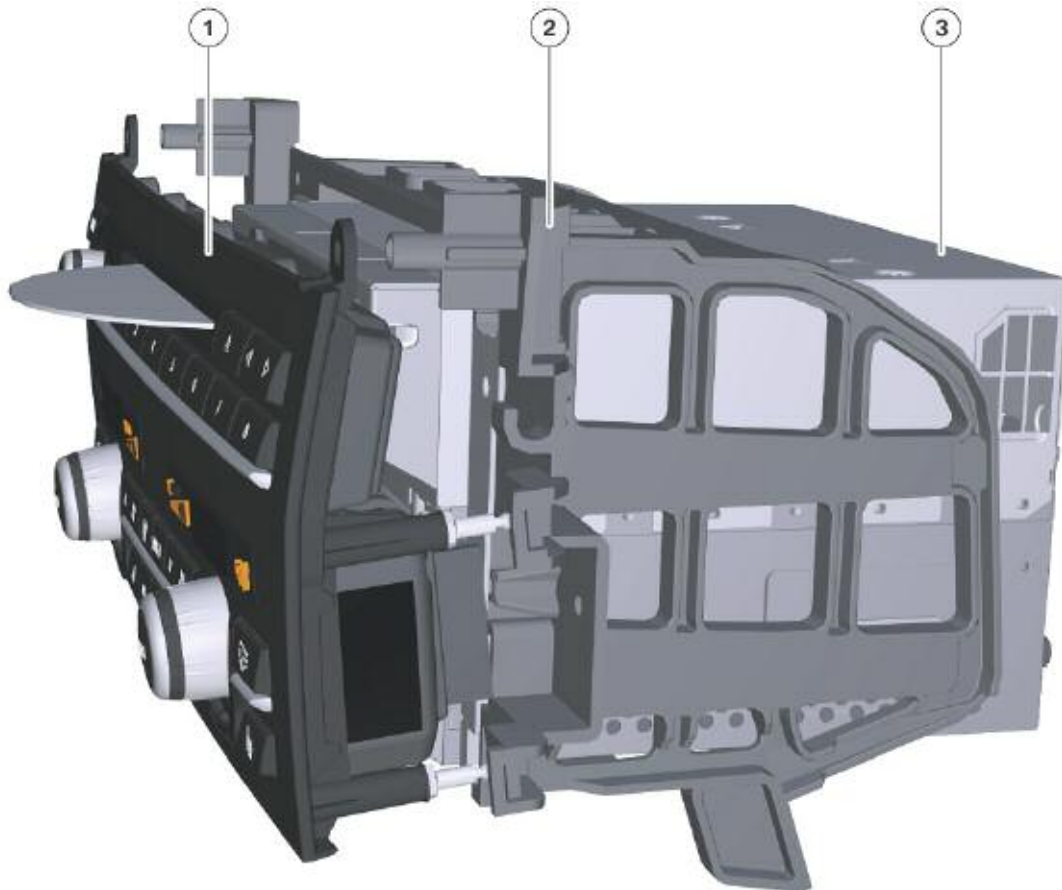
Car Information Computer (CIC)

The IHKA control unit is integrated into the IHKA/audio control panel.

The faceplate of the CIC is the common control panel for the main entertainment functions as well as for the heating and air conditioning functions.

The CIC and the IHKA/audio control panel are connected to the center console unit carrier.

Side view of IHKA/audio control panel



Index	Explanation	Index	Explanation
1	IHKA/audio control panel	3	Car Information Computer
2	Center console unit carrier		

Front view of IHKA/audio control panel of the F01/F02



Index	Explanation	Index	Explanation
1	Selector button for FM and AM	4	Eject button for DVD/CD player
2	MODE button for selecting audio sources	5	Station search/track "forward and back"
3	CD/DVD slot	6	Eight freely selectable Favosites buttons

Similar to a personal computer, the Car Information Computer contains a processor, RAM modules (= main memory) and extra peripheral components.

The following applications of the CIC are stored on the integrated hard disk:

- Music collection
- Music track database (Gracenote®)
- Navigation software (application)
- Navigation map material
- iSpeech (voice recognition system)
- Contacts (database with address book data)

The CIC is the central control unit for the listed applications. It is linked to the central information display (CID) for the purpose of transmitting and displaying information.

The Car Information Computer is also connected to the controller. The controller serves as a selection and input device for the user interface.

The CIC is based on a modular design. The most important systems of the communication network are integrated in the CIC board as solid state components.

The CIC combines the following control units in one enclosure:

- Navigation computer, HIP module and yaw rate sensor
- Tuner (FM)
- Tuner (AM)
- Tuner (FM-RTTI)
- IBOC decoder
- Audio system controller, and music search database
- MOST-CAN gateway
- Interface to control display (LVDS)

The upper half of the CIC consists of the optical drive player where CDs and DVDs of digital audio media can be played. The player also has ability to playback video DVDs on the front CID. The video signal is only displayed when the vehicle is stationary with the gear selection in the “Park” position.

For the navigation system, the optical drive can be used for updating the map material stored on the hard disk.

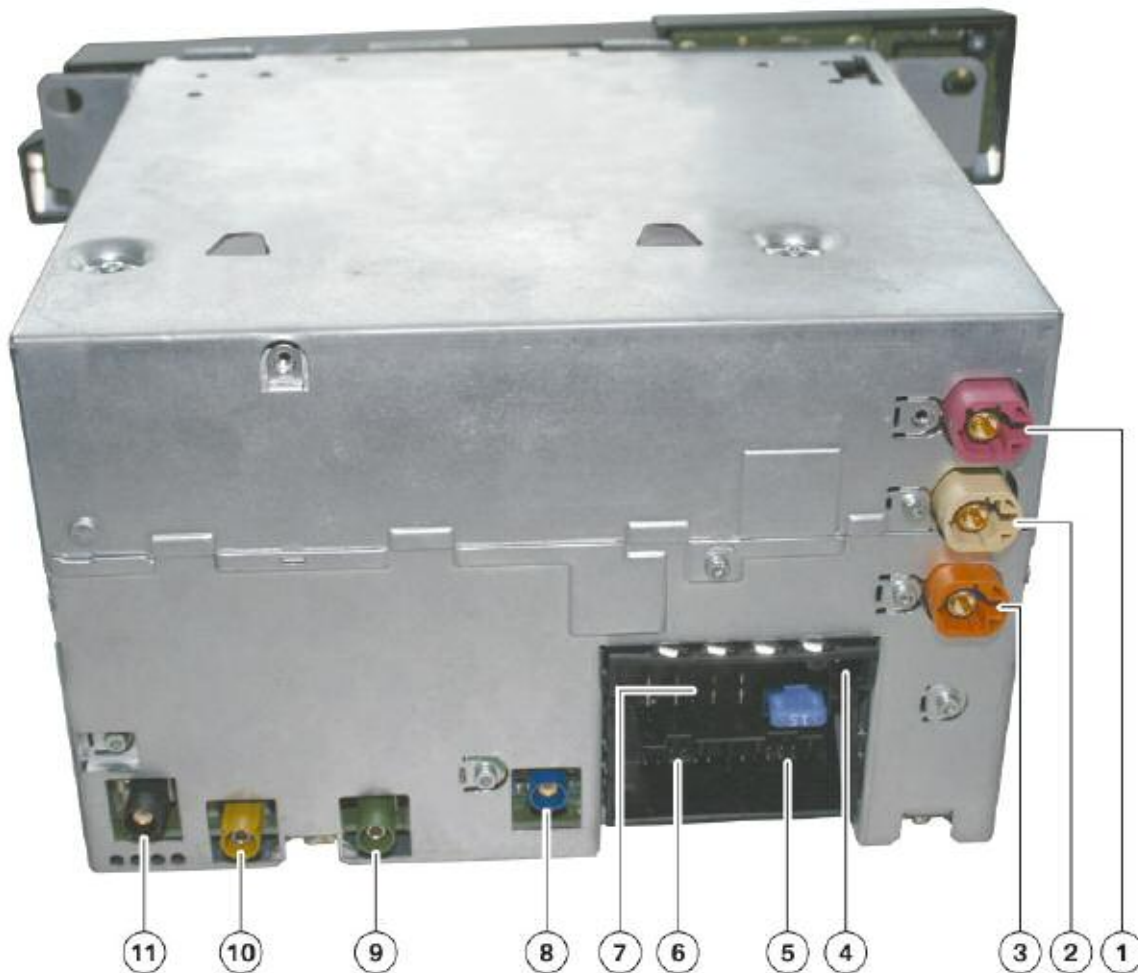
The processors for the main board and application board are located in the lower half of the CIC. This section also contains the main memory, the individual modules as well as the hard disk drive. The CIC together with the controller and CID, make up the iDrive system.

Advantages of the Car Information Computer

Combining several modules in one enclosure provides the following advantages:

- The combination of several systems enhances the functionality
- Outstanding software expansion options through suitable software interfaces
- Fewer plug connections increases reliability
- Less overall package space required for control units

Front view of IHKA/audio control panel of the F01/F02



Index	Explanation	Index	Explanation
1	LVDS signal for the CID; violet connector	7	16-pin connector (K-CAN, audio output AF; power supply, Rad-on signal)
2	USB connection for glove compartment beige connector	8	GPS antenna signal Blue connector
3	Ethernet connection (future expansion for rear seat entertainment) orange connector	9	Not for US
4	MOST connection	10	Not for US
5	12-pin connector; right-hand chamber (Ethernet, TEL_AF, AUX-In)	11	AM/FM tuner signal black connector
6	12-pin connector; left-hand chamber (video input signals - CVBS)		

■ LVDS Technology

The transmission of picture data from the CCC to the CID was performed by means of an 8-wire LVDS (low voltage differential signaling) line. With the introduction of the Car Information Computer, the video signal is now transmitted through a 2-wire LVDS line.

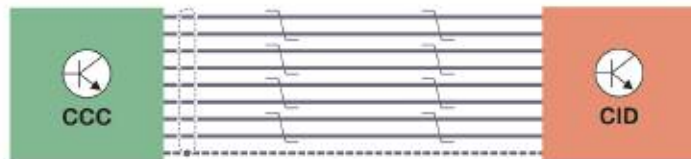
The change in picture data transmission in the vehicle reflect the changes made in PC technology. While the printer was formerly connected to the PC via a parallel cable, data transmission now takes place using serial USB technology.

In the following graphics, 8-wire LVDS technology is compared to the new 2-wire LVDS technology:

8-wire LVDS

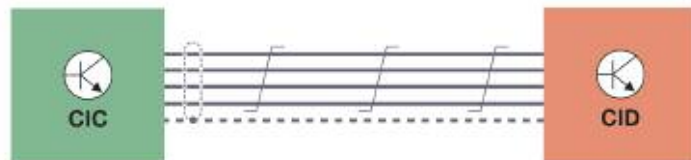
Transmission of video signals via 8-wire LVDS technology with CCC and CID.

(LVDS+ and LVDS- for each of the four signal lines and an additional synchronization line)



2-wire LVDS

Transmission of video signals via 2-wire LVDS technology with CIC and CID.



Signal transmission through this 2-wire LVDS line offers four distinct advantages:

- Higher data transfer rate
- Simplified wiring
- Runtime differences between the individual lines are avoided
- Serial 2-wire LVDS data transmission is now much more cost-effective than 8-wire LVDS technology

The main advantage of using serial 2-wire LVDS is the resulting high picture resolution.

A 4-core, shielded cable is used for the 2-wire LVDS technology. The cable consists of the four cores, LVDS+, LVDS-, 2x ground and shielding.

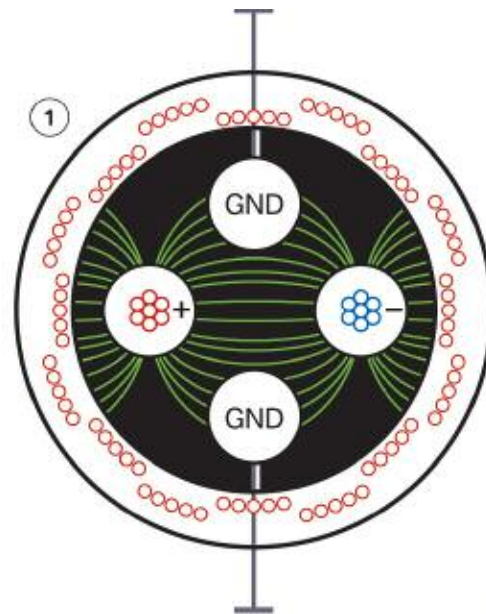
For Electromagnetic compatibility (EMC) reasons, the unused wire is also connected to ground.

In the illustration to the right, the advantages of both cores connected to ground are shown with the aid of field lines.

The capacitive interference of the signals is deflected to ground. The wires connected to ground form a defined potential and cannot act as antennas.

This ensures that additional interference is avoided.

Graphical Illustration of EMC protection using 2-wire LVDS technology



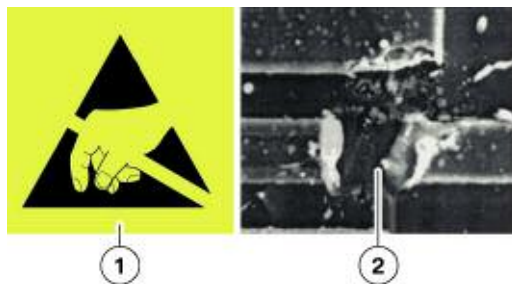
Index	Explanation
1	Two signal-carrying cores, two cores connected to ground

Electrostatic Discharge (ESD)

It is essential to follow ESD (Electrostatic Discharge) guidelines when replacing individual components in order to avoid damage to internal components of the CIC. These requirements also apply when storing or sending back components.

Special packaging (ESD bags, ESD boxes with film or foam material cladding) is available for this purpose and should be used instead of conventional packaging materials.

The following picture illustrates the effects of electrostatic discharge (ESD) on electronic components.



Index	Explanation
1	ESD symbol (protection measures necessary)
2	ESD damage to a conductor (magnified 5000 times)

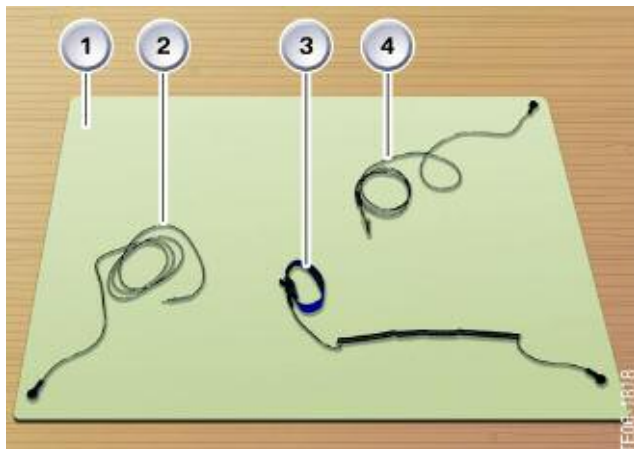
Effects of ESD (Electrostatic Discharge) on electronic components

Working on Electronic Components

The following requirements must be observed when working on electronic components on the Car Information Computer.

- The work must be performed on a conductive and grounded workbench (special tool 12 7 192 is used for this purpose).
- The grounding cable must be connected to a secure grounding point (water pipe, heating pipe, electric socket ground).
- The person carrying out the work must first put on the grounding cuff in order to ground himself before removing the components from the packaging.
- The electronic components are placed on the anti-static mat which is also connected to a grounding cable.

Anti-static mat Special tool 12 7 192



Index	Explanation
1	Anti-static mat
2	Grounding cable for the mat
3	Anti-static cuff
4	Grounding cable for the component

CIC Components

The components listed above are defined as separate or modular. These components are attached to the main/complete head unit.

Of these components, only the faceplate remains a serviceable and replaceable component. Failure of any other internal component will necessitate the replacement of the entire CIC unit once proper authorization has been obtained through PuMA.

The functions of the individual components are briefly described in the following pages.

The installation and removal instructions for the individual components and the complete CIC control unit are available in TIS (Technical Information System) or the workshop system ISTA.

Individual components of the CIC on the F01/F02



Index	Explanation	Index	Explanation
1	DVD/CD player including CIC housing cover	3	Hard Drive Disk
2	Car Information Computer		

■ Optical Drive (CD/DVD Player)

The Car Information Computer is equipped with a DVD-ROM player. The optical drive is used for playing audio and video media.

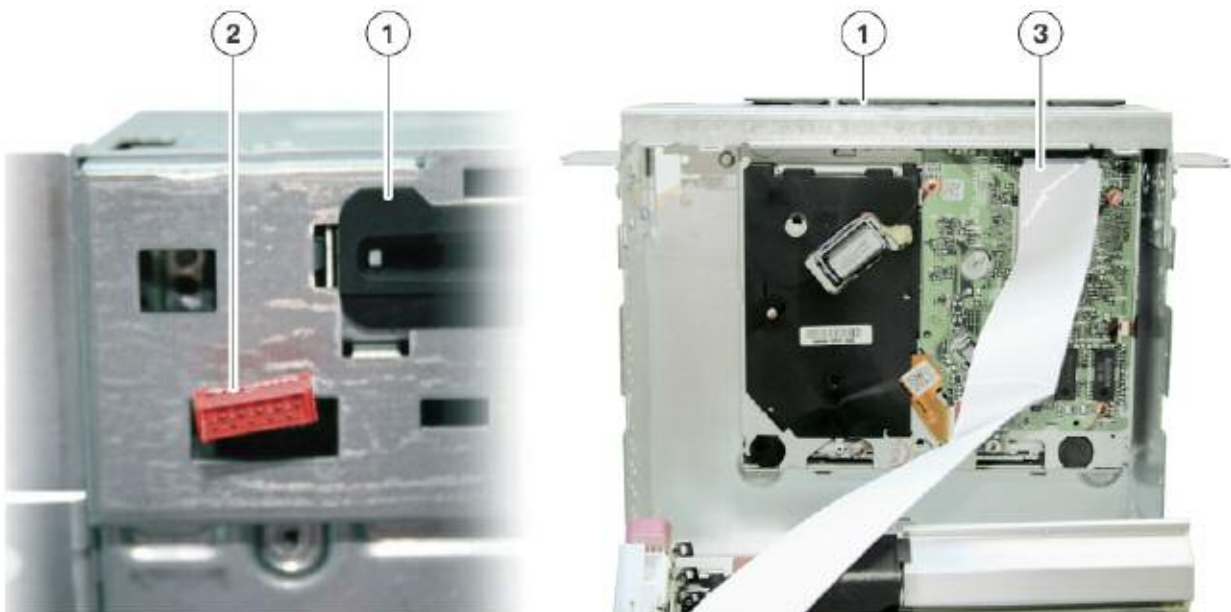
This drive makes it possible to play the following media file formats:

- Audio CDs (CD Digital Audio)
- Audio CD-ROM with MP3, WMA or AAC files
- DVD Audio (only stereo track if contained on the data medium)
- Audio DVD-ROM with MP3, WMA or AAC files
- Video DVD

Playing video on the (front) CID display is only possible when the vehicle is stationary with the gear selector in the “Park” position. When the vehicle is moving or in gear, only the audio track of the video will be played.

Although the CD/DVD drive is no longer used for the navigation system (as in CCC), it may be used to update navigation map data from a navigation DVD.

DVD player of the CIC



Index	Explanation	Index	Explanation
1	DVD player	3	Ribbon cable connection, DVD player to CIC head unit
2	Front panel connection		

■ Hard Disk Drive

With the development CIC, a hard disk for storing applications (programs) and data is used in a head unit of a BMW vehicle for the first time.

A 2.5" hard disk drive with a storage a capacity of 80 GB is installed.

This makes it possible to display complex graphics like 3D models in the perspective view of the navigation system.

This system provides the option of converting, storing and playing music tracks. The hard disk makes it possible to maintain a music collection with a music track database (Gracenote®).

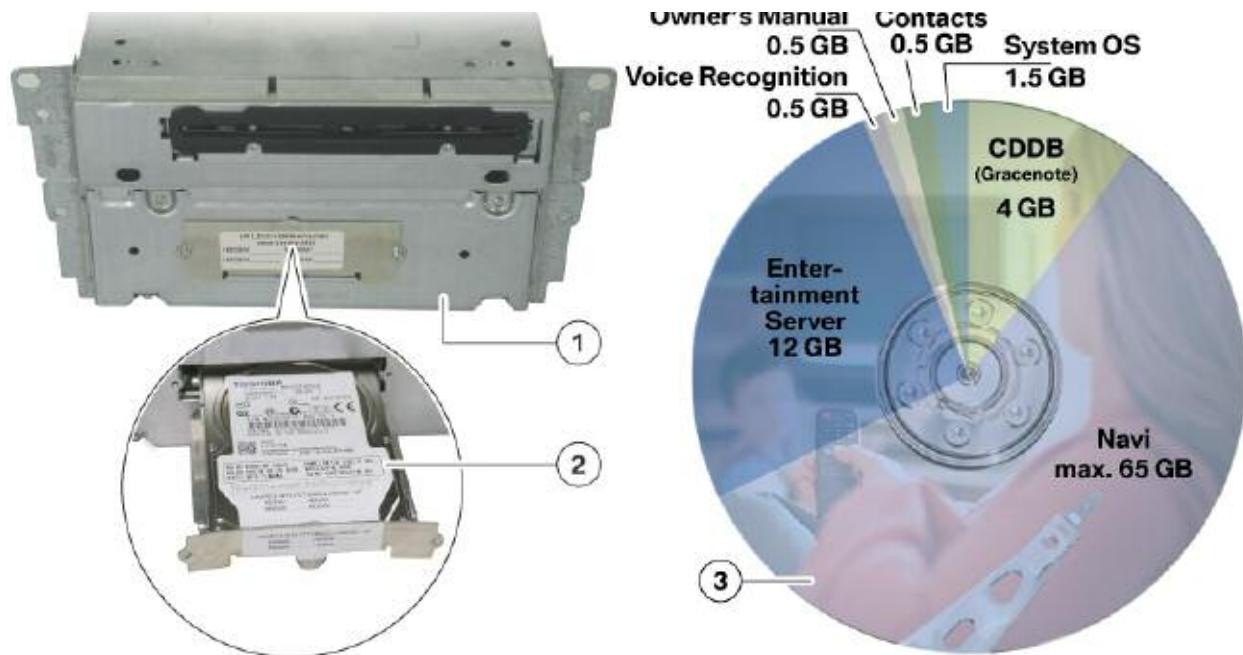
The HDD (hard disk drive) also provides a data storage option for the three languages of the voice recognition system.

The hard disk drive is a replaceable component of the CIC. Proper repair instructions and ESD guidelines must be followed when replacing the unit.

The Music collection backup should only be performed by the customer and not the service technician. For more information refer to “Music Collection Backup” in the Principles of Operation section of this training material.

The following illustrations show the hard disk location and the individual partitions.

Hard disk location and the individual partitions



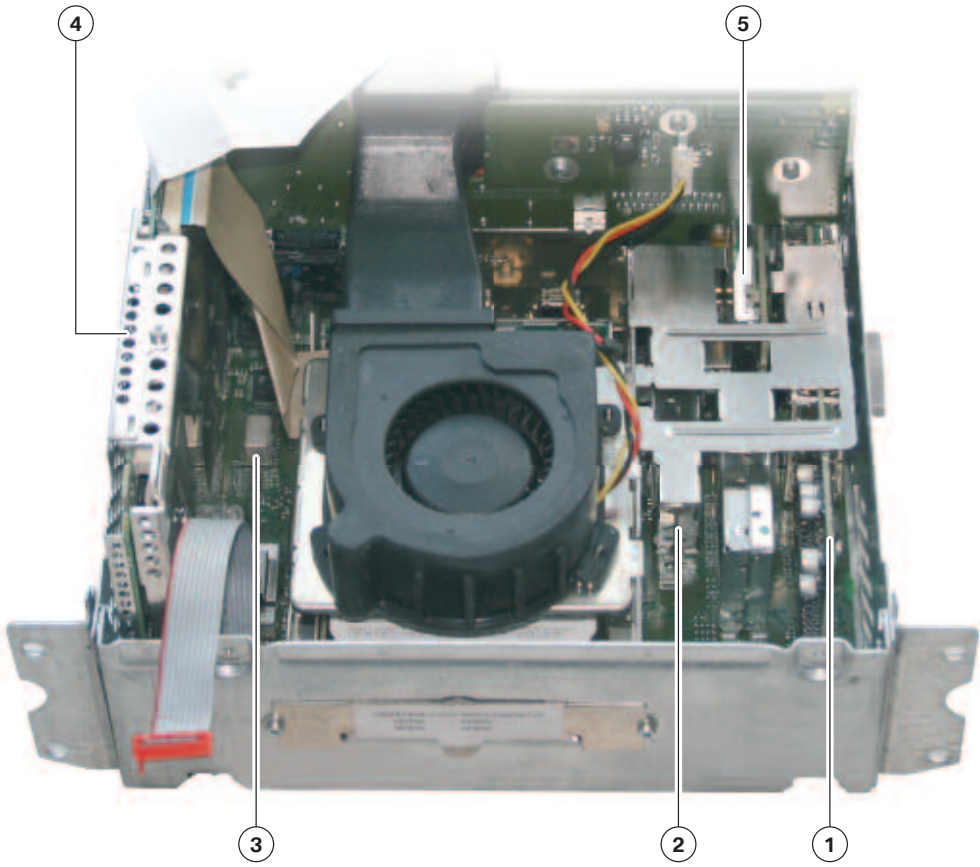
Index	Explanation
1	Car Information Computer
2	Hard disk (slide-in tray)
3	Pie diagram with individual storage units on the hard disk (partition)

Fixed Components

Some of the components that were modular in the Car Communication Computer are now integrated into the CIC as solid state components.

In the event of defects to some of the components, it may be necessary to replace the entire head unit after submitting a PuMA case.

Bottom open view of the CIC components

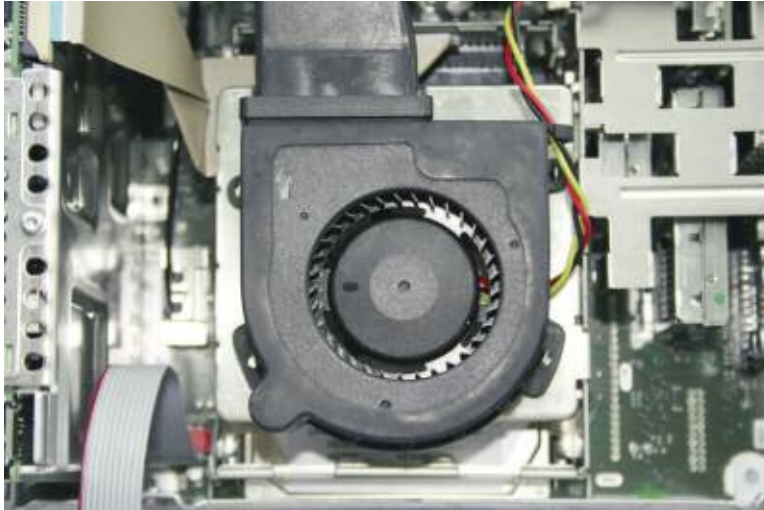


Index	Explanation	Index	Explanation
1	FM/AM double tuner module	4	Application board
2	IBOC decoder	5	FM - RTTI module
3	Yaw rate sensor		

Fan

Unlike with CCC, it is not possible to replace the fan of the Car Information Computer separately as part of a service procedure.

The fan provides cooling for the entire hardware assembly, including the hard disk drive and the gateway processor (located directly below it). The exhaust air cools the cooling fins of the HiFi output stage in the power board as it is routed through a cooling channel out of the unit.



CIC system's Cooling Fan location

GPS Receiver Module

The GPS receiver module is also known as the HIP module (Host Independence Positioning).

Location and route of the vehicle are calculated in the navigation system with the data from the GPS receiver module.

This module was already integrated in the head unit with the CCC system. It has the task of converting the signals received from the GPS antenna together with the data from the DSC control unit and yaw rate sensor.

The following information is calculated in the GPS receiver module:

- Longitude
- Latitude
- Altitude above sea level
- Direction (bearing)
- Speed

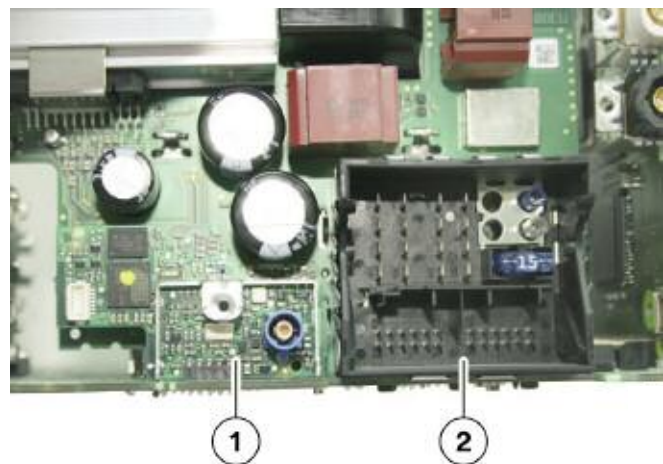
This information is known as Almanac data and it is transferred to the navigation system for further processing. The Almanac data must be permanently stored for future reference. One of the reasons for this is that it takes a long time for data to be received again from satellites after switching to terminal 15 from terminal status ignition "OFF".

This Almanac data ensures the position of the vehicle is recognized immediately after starting the vehicle. Therefore the navigation system can also be used immediately.

Compared to the GPS receiver module of the Car Communication Computer the GPS receiver module in the CIC has been greatly reduced in size while maintaining the same functionality.

The graphic shows the size of the GPS receiver module compared to the main connection plug of the head unit.

Index	Explanation
1	GPS receiver module
2	CIC main connection plug



CIC system's GPS receiver size compared to the Main Connector

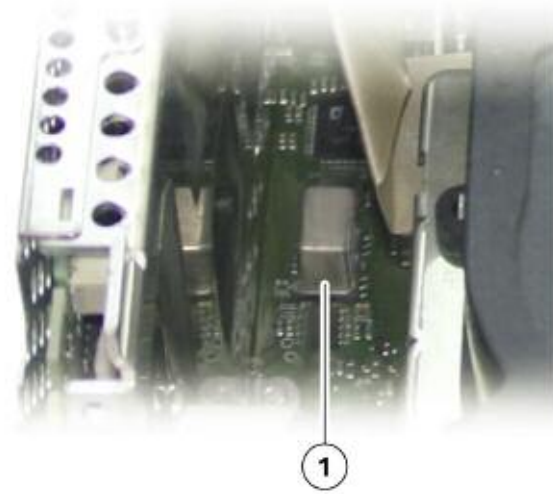
Yaw Rate Sensor

The Car Information Computer features a yaw rate sensor. It supplies the data relating to changes in driving direction for the navigation system.

This data is required for the purpose of determining the exact position as satellite signals cannot be received everywhere (tunnels, underground parking lot etc.).

The yaw rate sensor is a separate module soldered on the main board. It has been greatly reduced in size compared to the yaw rate sensor in the Car Communication Computer.

Unlike with CCC, it is no longer possible to replace the yaw rate sensor separately from the entire unit.



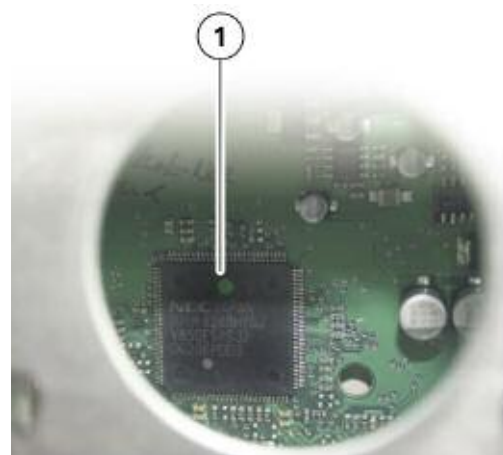
Location of the yaw rate sensor soldered to the CIC main board

Gateway Processor

The gateway processor converts all relevant data of the K-CAN system into MOST-bus telegrams and vice versa.

The electronic module is soldered into the board directly under the hard disk drive and cannot be replaced separately.

The gateway processor has its own control unit address in the BMW diagnosis system.



CIC system's Gateway Processor location

Analog Tuner Modules

The tuner modules in the Car Information Computer have enhanced functions compared to the tuners used in the CCC system. The FM/AM and the traffic information (RTTI) range have been expanded.

■ FM and AM Station List

A double tuner module (see item 1) is installed in the CIC for the FM/AM range.

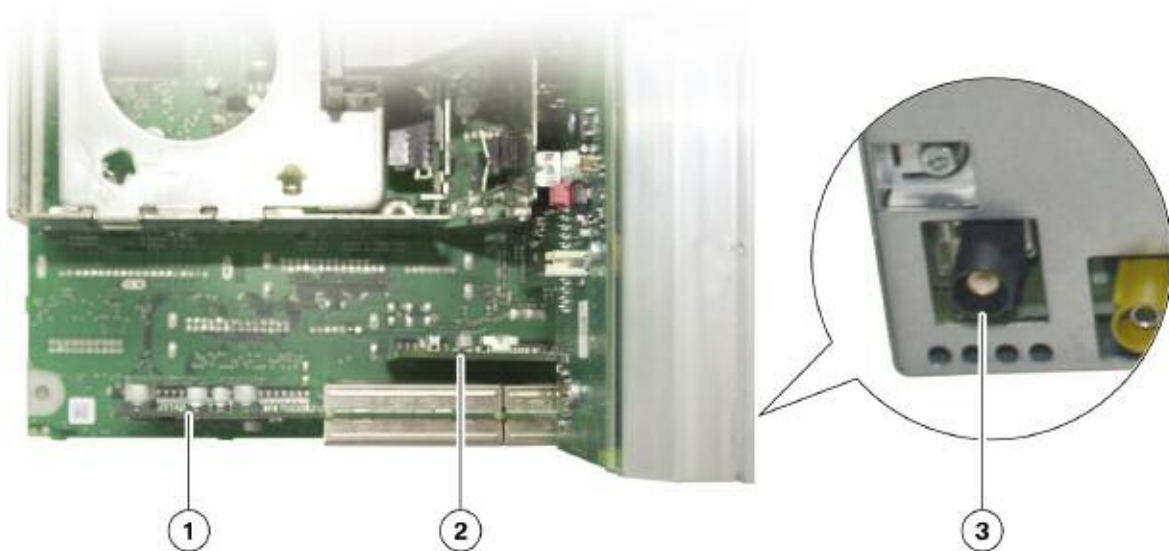
While one tuner in the network receives the required station and outputs the music signal, the other tuner works in the background searching the station landscape for additional signals and shows them on the display. ("All stations" menu item).

This function in the FM range is already known from the CCC and is now available in the AM range.

The third module in the tuner network enables expansion of the FM-RTTI (Real Time Traffic Information) functions. The FM/AM double tuner module and the FM-RTTI module combine to form the triple tuner.

The RTTI messages are used by the navigation system for displaying congestion and traffic information in the form of pictograms.

FM tuner module component location in the CIC



Index	Explanation
1	FM/AM double tuner module
2	FM-RTTI module
3	Black FAKRA connector below the CIC heat sink

IBOC System/HD Radio

The IBOC (In-Band- On-Channel) system is offered as the digital radio. With the introduction of the CIC, the control unit of the IBOC system has been integrated in the head unit as the IBOC decoder.

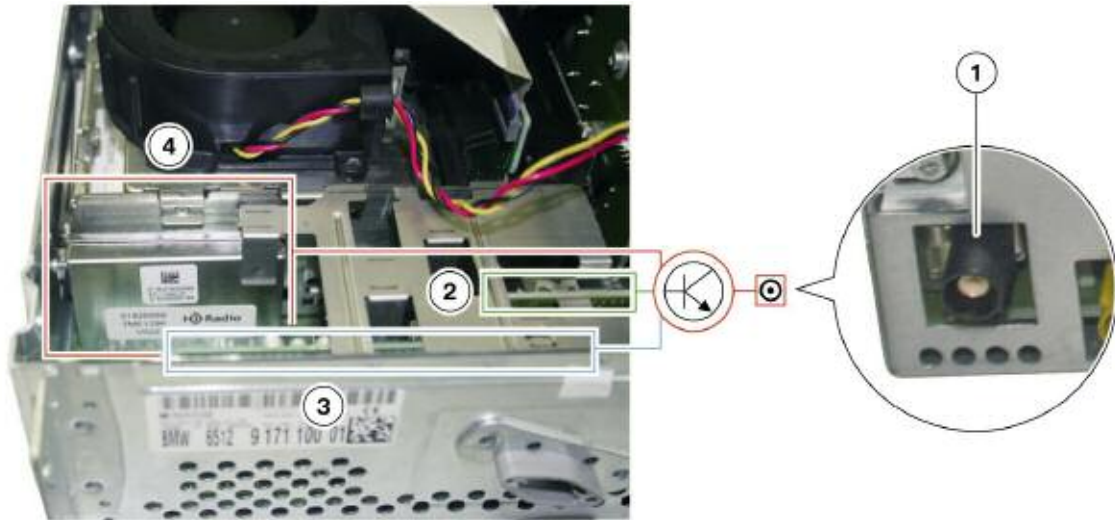
The IBOC system was developed by the company Ibiquity and, with the aid of a decoder, enables the reception of HD (High Definition) radio through the FM/AM double tuner.

This system simultaneously broadcasts an analog and digital signal.

A special oscilloscope (spectrum analyzer) would show the digital components at both sides of the analog wave of the FM frequency (step shape).

The IBOC system receives the signals with the aid of the FM double tuner module.

These signals are then routed to the IBOC decoder which adds the digital data stream to the audible music signals.



Location of the IBOC decoder in the CIC

Index	Explanation	Index	Explanation
1	FM/AM antenna connection	3	FM/AM double tuner module
2	FM-RTTI module	4	IBOC decoder

There are two types of broadcast services:

- MPS = Main Program Service
- SPS = Secondary Program Service



IBOC Station List Menu

Both services differ to the effect that the signal previously broadcast analog in the MPS is now used in digital form.

The decoder delays digital reception for several seconds until it is synchronous again with the analog signal previously heard.

SPS offers additional radio stations that are only broadcast in digital form. Using the multicast method, it is possible to accommodate up to seven digital stations in the submenu of the SPS main station. Normally, however, a maximum of 3 sub-menu are offered in the SPS.



Sub-menu of the IBOC main station

The system automatically switches over to analog FM reception if the digital signal is no longer available.

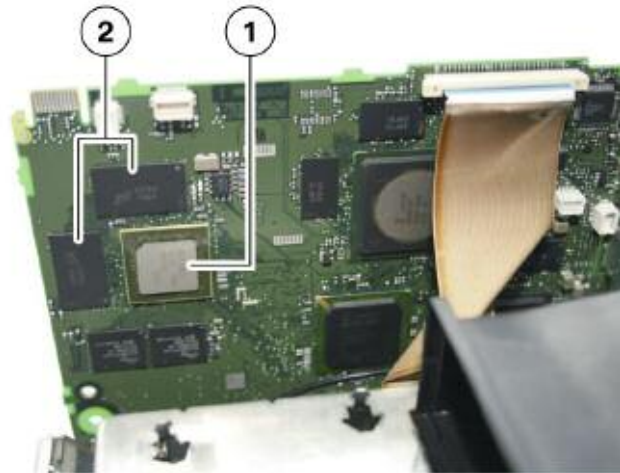
HD radio is also available in the AM frequency range. In this case, the digital signals are transmitted on directly adjacent frequencies of the analog station. Multicast is not supported on AM. The content of the digitally broadcast station is the same as that of the analog station.

HD radio plays AM radio stations in near-FM quality and FM radio stations in near-CD quality.

CIC Application Board with Processors

The application board accommodates the main processor (Central Processing Unit) and the main memory modules (Random Access Memory) for the CIC. These components are soldered into the board and cannot be replaced.

Index	Explanation
1	CPU - Central processing unit
2	Main memory (RAM) of the CIC



CPU and Main Memory Location

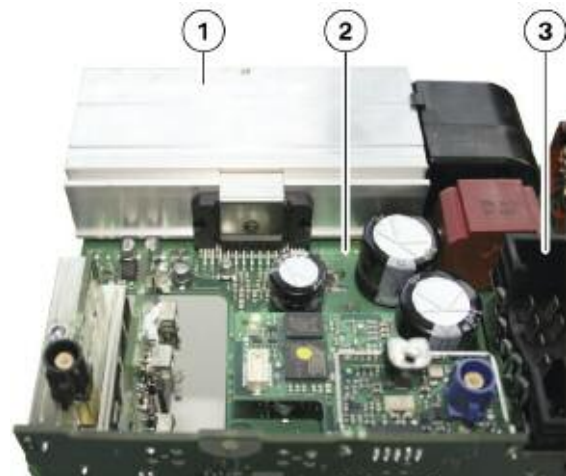
Power Board

The power board is located beneath the CIC heat sink and on the left next to the CIC main connector. It contains both the audio output stages for the speakers of the stereo system as well as the power supply unit for the CIC.

The heat sinks and CIC fan cool the system by dissipating the heat from the power supply unit and amplifier.

The unit interfaces with the vehicle's electrical system (power supply, MOST link, etc.) through the main connector.

Index	Explanation
1	Heat sink
2	Power board
3	Main connector of the CIC



CIC Main Board and Heat Sink Location

Amplifiers and Speakers

The speaker systems on the F01/F02 are available in two versions:

- HiFi system (Standard)
- Top-HiFi system. (Option)

The HiFi system is the standard audio equipment for the F01/F02 . The HiFi system is equipped with a 8-channel amplifier with digital equalizer. However only 7 of the 8 channels are used in the HiFi system.

The central bass speakers are located under the front seats. They are coupled to the side sills (rocker panels). That increases the resonance volume necessary for bass reproduction.

The head unit CIC can be combined with any of the two amplifier/speaker systems.

The HiFi and Top-HiFi systems feature separate speakers for the treble and midrange frequencies.

Even though the diameters of the speakers in the HiFi and Top-HiFi systems are the same, there are differences in the power output of the speakers. This is achieved by the use of different materials for the diaphragms, coils and magnets. The designations HiFi and Top-HiFi are used in the table in the next page to distinguish the systems.

The Top-HiFi system achieves double the sound level of the HiFi system.

A digital 10-channel amplifier is used in the Top-HiFi system. However only 9 of the 10 channels are used in the Top-HiFi system.

The Top-HiFi system supports playback of multichannel formats. Multichannel audio formats can be played back with the player in the CIC or with the 6 DVD changer.

Optimum audio reproduction in the vehicle is achieved by way of complex digital signal processing.

The HiFi system has 12 speakers while the Top-HiFi system has 16 speakers each with different auxiliary amplifiers.

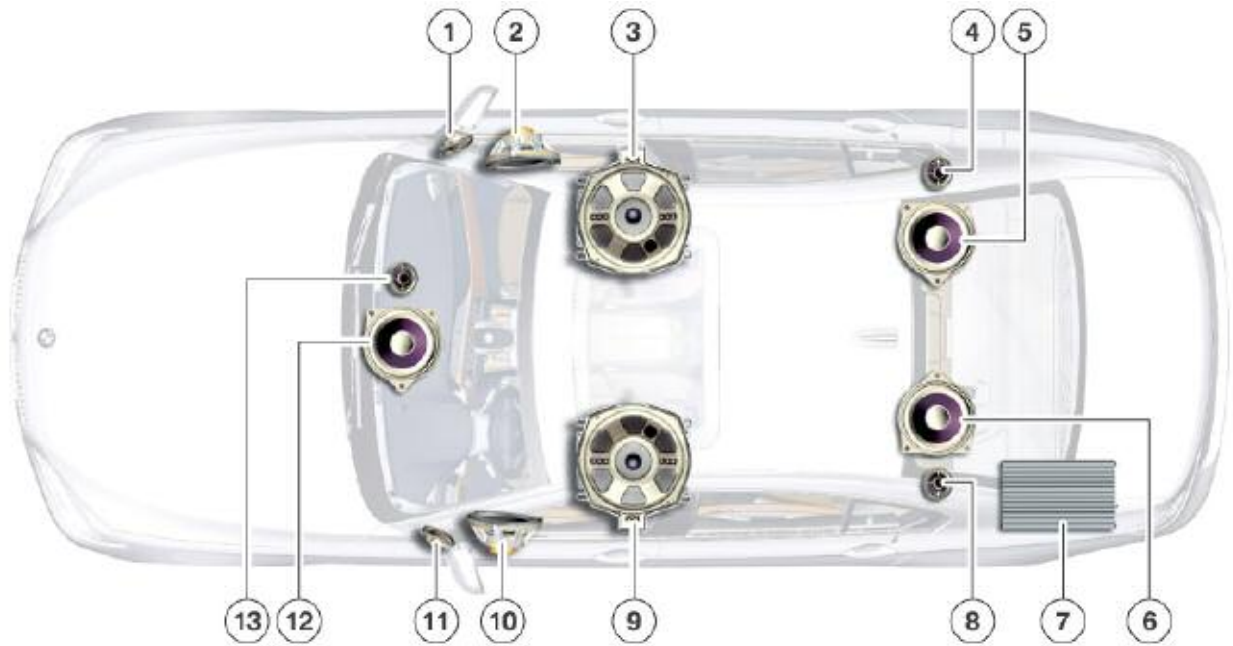
The following chart explains the two available sound systems for the F01/F02:

	HiFi system	Top-HiFi system
Number of speakers	12 2 - woofers (2 Ohm) 5 - mid-range speakers (4) 5 - tweeters (4 Ohm)	16 2 - woofers (2) 7 - mid-range speakers (4) 7 - tweeters (4)
Output of 7-channel HiFi amplifier:	205 W 2 - 40 W (2 .) Bass 5 - 25 W (4 .) Mid-range/treble	
Output of 9-channel Top-HiFi amplifier:		600 W 2 - 125 W (8.) Bass 7 - 50 W (4.) Mid-range/treble
Sound pressure	>104 dB as from 50 Hz	>110 dB as from 40 Hz
Bandwidth	30 Hz up to 20 kHz	20 Hz up to 20 kHz
Linearity	+/-4.5 dB	+/-3 dB
Tweeter Manufacturer	26 mm (Medium) Denon & Marantz PSS	26 mm (High) Denon & Marantz PSS
Mid-range speaker Manufacturer	100 mm (Medium) Denon & Marantz PSS	100 mm (High) Denon & Marantz PSS
Woofers Manufacturer	217 mm Denon & Marantz PSS	217 mm Denon & Marantz PSS

HiFi Speaker System

The digital 7-channel HiFi amplifier is supplied by Lear. The HiFi system consists of a HiFi amplifier with the 12 speakers. This system is fitted as standard on the F01/F02.

HiFi Speaker System on the F01/F02



Index	Explanation	Index	Explanation
1	Tweeter, front right door	8	Tweeter, rear window shelf, left
2	Mid-range speaker, front right door	9	Woofer, under left front seat
3	Woofer, under right front seat	10	Mid-range speaker, front left door
4	Tweeter, rear window shelf, right	11	Tweeter, front left door
5	Mid-range speaker, rear window shelf, right	12	Mid-range speaker, front center
6	Mid-range speaker, rear window shelf, left	13	Tweeter, front center
7	HiFi amplifier		

HiFi Amplifier

The HiFi amplifier is connected to the K-CAN for coding and diagnostics. The HiFi amplifier can be programmed but it is supplied by the manufacturer already preprogrammed at the factory.

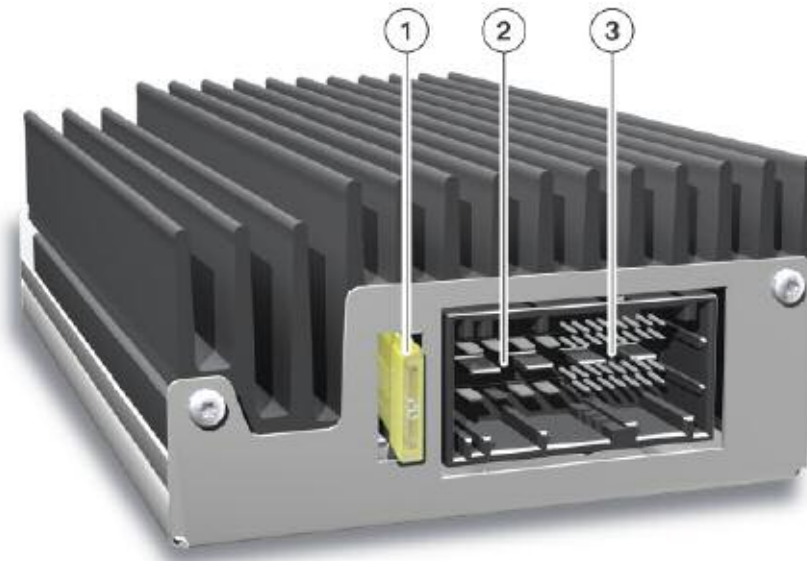
The Audio signals are transmitted in analog form from the head unit to the HiFi amplifier. The internal digital equalizer adapts the audio signals specifically to the vehicle, as determined by the coding. The iDrive does not equalize any signals.

The adapted and amplified signals of HiFi quality are distributed through seven audio channels to a total of twelve speakers:

- One tweeter and one mid-range speaker in each of the front doors.
- One tweeter and mid-range speaker in the dashboard (center).
- One tweeter and one mid-range speaker on the rear shelf.
- One central bass speaker under each of the front seats.

The HiFi amplifier is located at the rear left of the luggage compartment behind the side panel trim.

HiFi amplifier

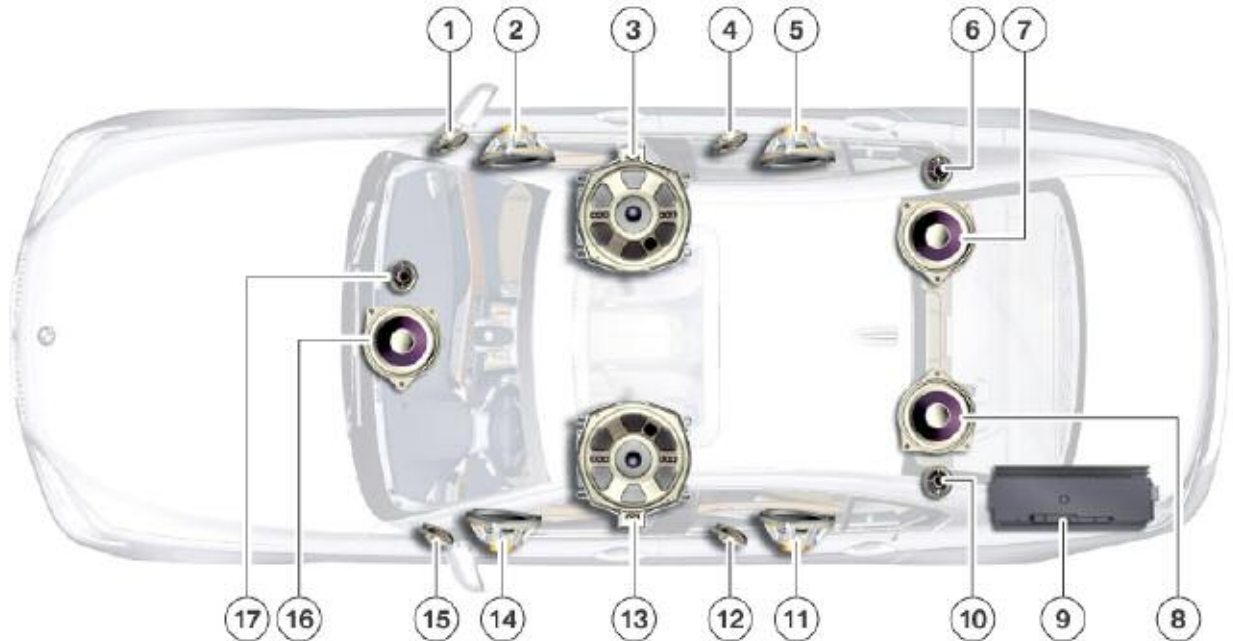


Index	Explanation	Index	Explanation
1	Safety fuse	3	Connection for audio signals, K-CAN and control signals
2	Connection for central bass speakers and power supply		

Top-HiFi Speaker System

The digital 10-channel Top-HiFi amplifier is also supplied by Lear. The 16 speaker Top-HiFi system is available as the premium option.

Top-HiFi Speaker System F01/F02



Index	Explanation	Index	Explanation
1	Tweeter, front right door	10	Tweeter, rear window shelf, left
2	Mid-range speaker, front right door	11	Mid-range speaker, rear left door
3	Woofer, under right front seat	12	Tweeter, rear left door
4	Tweeter, rear right door	13	Woofer, under left front seat
5	Mid-range speaker, rear right door	14	Mid-range speaker, front left door
6	Tweeter, rear window shelf, right	15	Tweeter, front left door
7	Mid-range speaker, rear window shelf, right	16	Mid-range speaker, front center
8	Mid-range speaker, rear window shelf, left	17	Tweeter, front center
9	Top-HiFi amplifier		

Top-HiFi Amplifier

The features of the Top-HiFi amplifier are:

- MOST control unit
- Graphic 7-channel equalizer controlled by iDrive
- Playback of multichannel audio formats
- Higher output power in the low frequency range
- 15 V output voltage for each mid-range speaker/tweeter
- 30 V output voltage for each central bass speaker

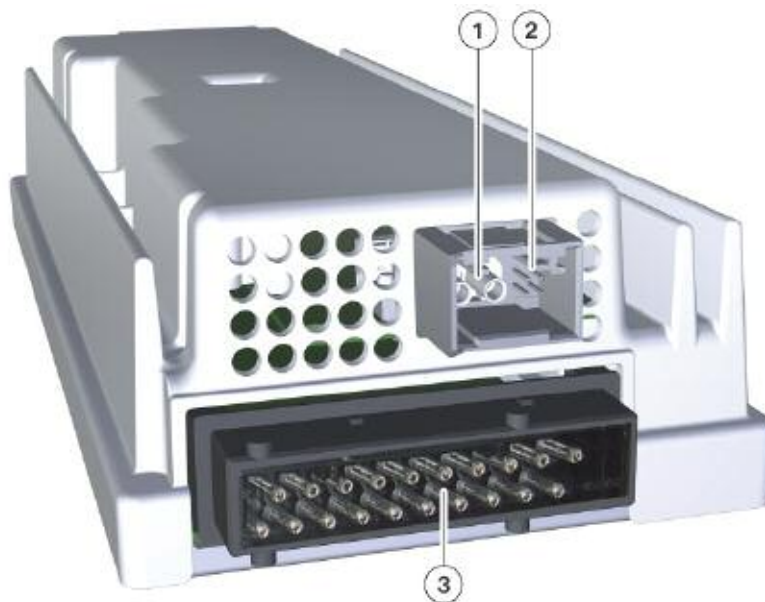
The audio signals and the control signals are sent in digital form to the Top-HiFi amplifier through the fiber-optic cable (MOST).

Programming, coding and diagnostics are carried out via the MOST.

The Top-HiFi amplifier supports playback of multichannel signals in 5.1 format.

The signals are output in 7.2 format (seven mid-range/treble channels and two central bass channels).

Top-HiFi amplifier



Index	Explanation	Index	Explanation
1	MOST connection	3	Power supply, audio signals to speakers
2	Reserved for load/logic separation, 10th channel preparation		

Using those channels, the sound tracks on a DVD can be played directly and entirely independently on each individual channel. In combination, those sound tracks produce a surround sound effect. For that reason, the process is described as discrete multichannel playback.

There are normally two sound tracks recorded on a CD to reproduce the stereo signal, the usual practice on a DVD is to use the 5.1 format with 6 sound tracks.

To adapt that format best to the vehicle environment (two rows of seats), it is converted into 7.2 format and reproduced through seven mid-range/tweeter and two central bass channels.

For multichannel playback, the Top-HiFi amplifier decodes the digital data from the data source.

Multichannel audio formats can be played back both with the CIC player as well as the DVD changer.

The following multichannel audio formats are supported:

- Dolby Digital Surround
- Dolby Digital Surround Ex
- DTS (Digital Theater System)
- DTS-ES (Digital Theater System-Extended Surround)

The multichannel audio format is indicated on the DVD case.

The Top-HiFi amplifier supports **Dolby Pro Logic II** for calculating the spatial sound information from an existing stereo signal.

This process replaces Logic 7 known from other BMW vehicles. A surround sound effect can be computed from the stereo signal, which consists only of a left and right channel.

The signals of the individual channels are output with time correction from the 16 available speakers of the Top-HiFi system in the F01/F02. This produces a homogeneous sound effect for the listener in 7.2 format.

Audio playback can also be adjusted by the customer through the iDrive with the aid of the 7 channel equalizer integrated in the Top-HiFi amplifier.

After signals have been processed, the audio signals are forwarded as analog low frequency signals to the speakers.

The Top-HiFi amplifier supports speed-dependent equalization in addition to speed-dependent volume control. The effect is that the frequency response is adjusted in relation to the speed of the vehicle.

A total of 16 speakers are controlled through nine amplifier channels with Top-HiFi quality:

- one tweeter and one mid-range speaker in each of the front doors.
- one tweeter and one mid-range speaker in the dashboard (center).
- one tweeter and mid-range speaker in each of the rear doors.
- one tweeter and one mid-range speaker on rear shelf.
- one central bass speaker under each of the front seats.

The Top-HiFi amplifier is located in the rear left of the luggage compartment behind the side panel trim. It is cooled by it's own cooling fan.



Top-HiFi amplifier with additional fan

Antenna System Overview

Depending on the optional equipment, F01/ F02 vehicles are equipped with different antennal systems:

- FM/AM radio with IBOC system (rear window antennas)
- Roof antenna for SDARS satellite radio
- Navigation system (roof antenna)
- Remote control services (rear window antenna)
- Telephone (roof antenna)

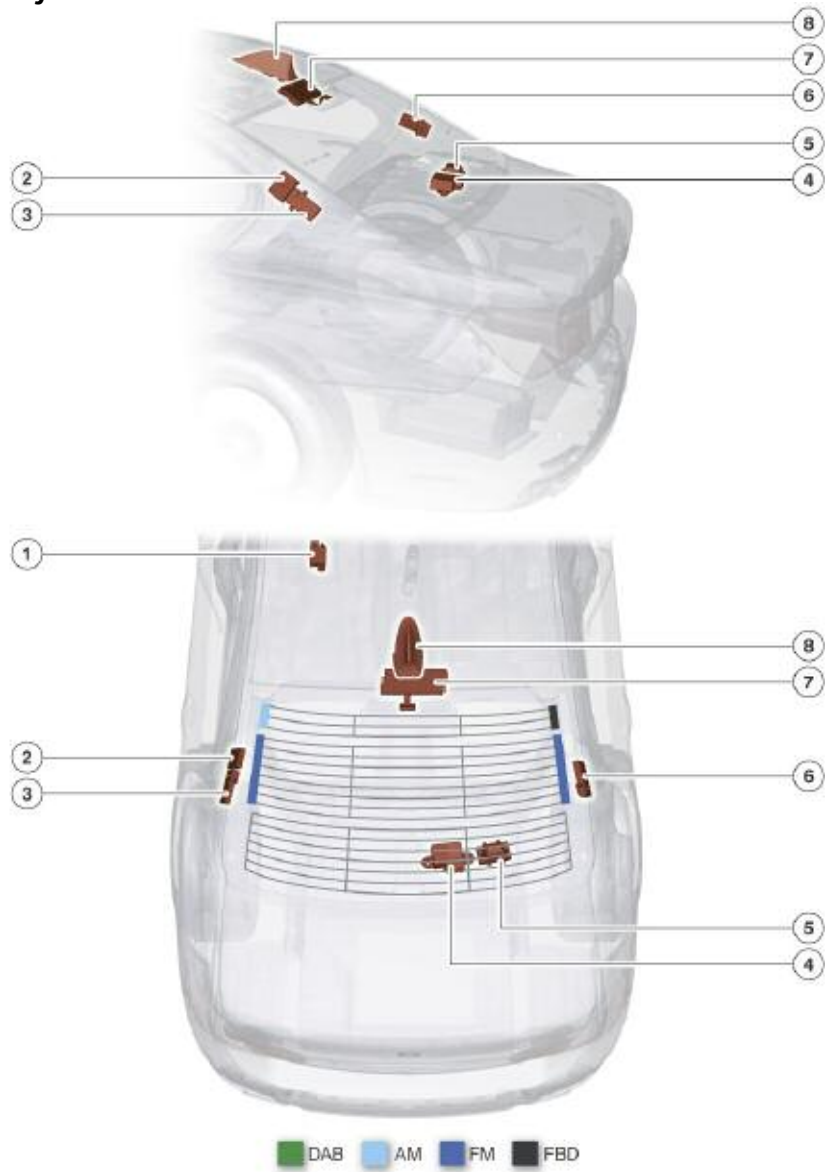
The vehicles are also equipped with the following telephone system antenna:

- Bluetooth antenna in area of sunroof; for connecting a mobile phone with Bluetooth capabilities.
- Emergency call GSM antenna (with telematics control unit (TCU) and BMW Assist.

A description of the individual antenna and rejection filters for the antenna diversity module with antenna amplifier for outstanding radio reception.

Reference is also made to the antenna for the telephone systems, navigation and remote control services (FBD). These antenna are described in detail in the respective training material.

F01/F02 Antenna System



Index	Explanation	Index	Explanation
1	Bluetooth antenna	5	AM restrictor
2	HBL filter (HBL = additional brake light)	6	FM rejector circuit, right
3	FM rejector circuit, left	7	Antenna amplifier with diversity module and remote control service (FBD)
4	Emergency call GSM antenna	8	Roof antenna (GPS receiver for navigation, telephone antenna, digital tuners)

Antenna Diversity Module with Amplifier

The high frequency signals broadcast by the radio stations are received via the rear window antennas (FM1, FM2, FM3 and AM)

The antenna amplifiers are in the antenna diversity module. There are separate amplifiers for AM and FM. The antenna amplifier (of the antenna diversity module) is located between the 3rd brake light and roof antenna.

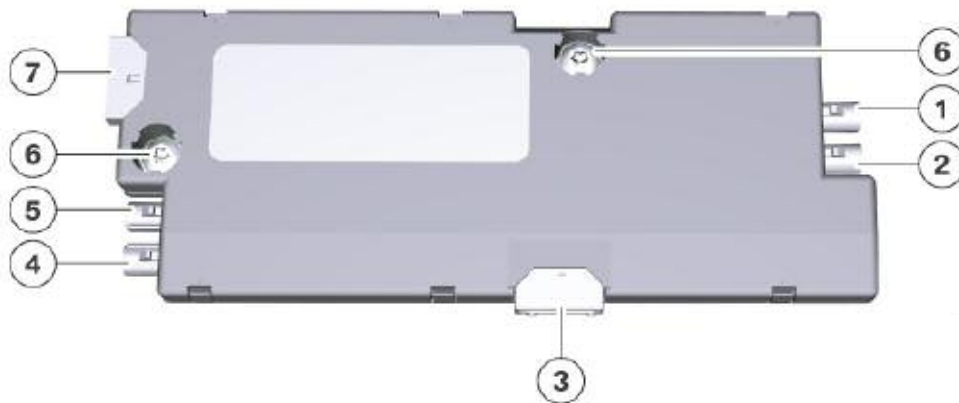
When the CIC is switched on, the antenna diversity/amplifier is activated and powered by the Rad_On signal. The remote control service part of the antenna diversity module is powered via terminal 30.

The high frequency signals from the AM and FM antennas as well as from the is amplified. These signals are routed via a ribbon cable from the rear window to the antenna diversity module.

The antennal amplifier also supports the frequencies of the weatherband.

Weatherband is transmitted over seven channels in the frequency range from 162.400 MHz to 162.550 MHz. The weatherband tuner is incorporated in the FM module of the head unit.

F01/F02 Antenna Diversity module with Antenna Amplifier



Index	Explanation	Index	Explanation
1	Not for US	5	AM/FM RF signal, IF for diversity, Radio diagnosis (black connector)
2	Not for US	6	Threaded ground connection to vehicle body
3	Ribbon cable from rear window to antenna diversity module with antenna amplifier	7	Power supply of antenna diversity module with antenna amplifier; Rad_on, Kl. 30, CAS-LIN, shielding
4	Not for US		

FM Antenna Diversity

In the F01/F02, an FM antenna diversity is standard equipment.

The FM antenna diversity comprises:

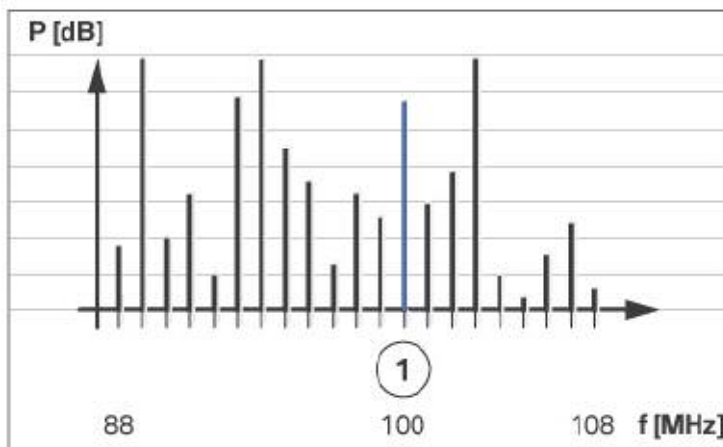
- FM1, FM2 and FM3 antennas
- FM antenna amplifier with diversity module

The FM1 to FM3 antennas route their RF signal to the antenna amplifier in the antenna diversity module.

The signal quality of the currently selected FM antenna (FM1 to FM3) is now evaluated in the antenna diversity module.

The high-frequency signal from the active FM antenna at any particular time is fed by the antenna amplifier and antenna diversity module via a coaxial cable to the tuner module in the head unit.

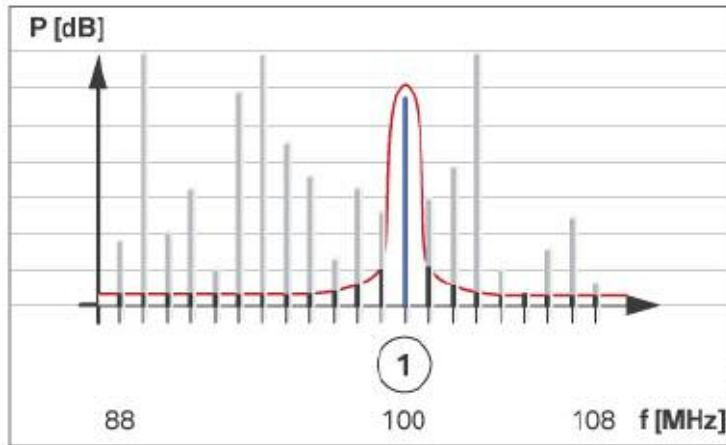
Input frequency at tuner module in CIC



Index	Explanation
1	Station frequency prior to selection by customer

The tuner module in the CIC is now informed of the station selected by the customer using iDrive. As a result, the tuner module in the CIC selects the matching frequency. This is done by setting a bandpass filter. The bandpass filter suppresses all frequencies above and below the selected station frequencies.

Selected station frequency after bandpass filtering in the tuner module



Index	Explanation
1	Station frequency after selection by customer

The remaining RF signal is then demodulated in the tuner and output in the form of an audio signal through the speakers.

The tuner module in the CIC detects that an antenna diversity module is installed and generates the changeover voltage (U_S) and the signal of the intermediate frequency (IF) necessary for diversity operation.

■ Selection of the individual antennas (diversity function)

The intermediate frequency is an RF signal (10.7 MHz) and is evaluated by the electronic circuitry inside the diversity module. The antenna diversity module will switch to the next FM antenna if the signal quality of the current radio station on the active antenna deteriorates to a certain level in terms of quality and field strength.

The changeover takes place in a way that no interruption can be heard.

■ Selection of the various reception modes of the antenna diversity module

The changeover between AM reception, FM diversity operation and diagnostic mode occurs in response to the DC voltage U_S .

This is performed in the head unit and analyzed in the diversity module with the following criteria:

- Diversity mode is active when $U_S = 2.5$ V.
- AM mode is active, or the FM1 antenna is selected, when $U_S = 0$ V.
- Diversity mode is active at $U_S = 5$ V.
- The changeover in diagnosis mode to the next antenna takes place by 8 V pulses.

AM Diversity

For AM services (SW, MW and LW) no antenna diversity system is provided as there is only one AM antenna.

Remote Control Services (FBD)

In addition to the antennas listed above there are the antennas for the remote control services (FBD) and the nine antennas for comfort access (four antennas on the outside and five in the interior).

Note: For detailed information on the antennas system refer to the F01/F02 “Central locking”, “Comfort Access” and “Car Access System” Training Material.

FM Rejector Circuit

The two rejector circuit modules for FM are located on the left and right of the rear window.

One rejector circuit is intended for the power supply of the lower section of the rear window.

The second circuit is for the upper section of the rear window defogger which is powered by the AM restrictor described in the following pages.

Index	Explanation
1	Rejector circuit on left side Terminal 31, rear window: lower section of rear window
2	Threaded ground connection to vehicle body
3	Rejector circuit on left-side Terminal 31, connection, vehicle wiring harness



Left side antenna amplifier

Index	Explanation
1	Rejector circuit on right side Terminal 30, rear window: lower section of rear window
2	Threaded ground connection to vehicle body
3	Rejector circuit on right side Terminal 30, connection, vehicle wiring harness



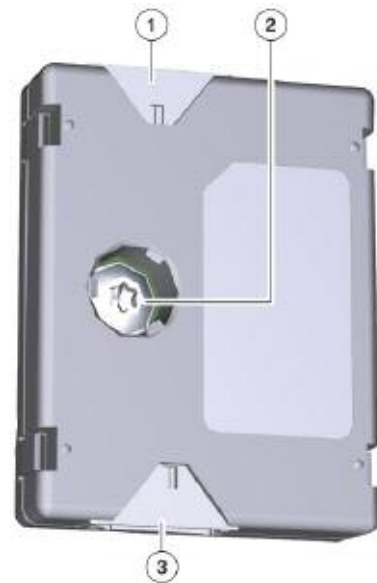
Right side antenna amplifier

HBL Filter

The HBL filter is fitted to suppress interference pulses from the additional brake light during radio reception. HBL stands for high-level brake light (third brake light).

A pulse-modulated signal (PWM) activates the third brake light. This kind of activation (PWM rectangular signal) can cause high-frequency interference. This is especially common with AM reception. The reason for this is that the audio information is contained in the amplitudes in the AM signal.

Index	Explanation
1	HBL filter - connection to additional brake light and for powering the diversity module with antenna amplifier
2	Securing screw with ground connection
3	HBL filter, connection to vehicle wiring harness



HBL (high level brake light) filter

AM Restrictor

AM reception has been improved on the F01/F02.

Due to the great distances with relatively few radio broadcasting towers, in less populated areas of the US AM radio is more accessible than FM radio.

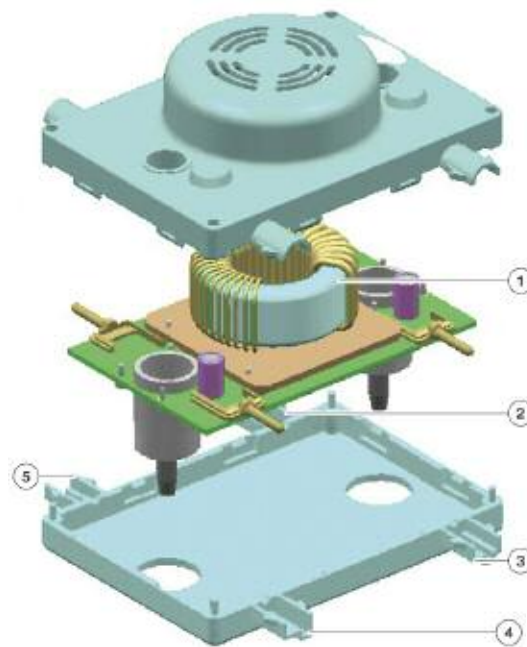
Interference frequencies from the vehicle electrical system pose reception problems in terms of the quality of AM radio. In an unrestricted antenna system, these interference frequencies spread from the vehicle electrical system through the power supply to the rear window defogger into the antenna system.

The AM restrictor was specially developed to address this issue.

The AM restrictor supplies voltage to the upper section of the rear window. In addition, the rejector circuit components provide sound quality filtering.

The main component is a coil which acts as an extremely high resistance to RF signal, resulting in significantly improved AM reception.

Restrictor circuit AM for the rear window



Index	Explanation	Index	Explanation
1	Interference suppression coil for AM range	4	Ground supply from vehicle wiring harness
2	Positive supply to rear window	5	Ground supply to rear window
3	Positive supply from vehicle wiring harness		

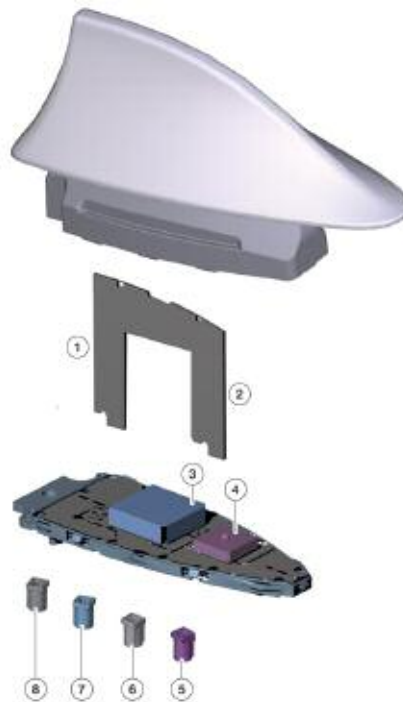
Roof Antenna

The roof antenna housing is always fitted regardless of the equipment options on the vehicle.

The roof antenna includes the following components:

- Mobile phone antenna
- Telematics Control Unit (TCU) telephone antenna
- GPS antenna
- SDARS satellite radio reception antenna

F01/F02 Roof antenna



Index	Explanation	Index	Explanation
1	Telephone antennas for telematics control unit (TCU)	5	SDARS signal, satellite and terrestrial (violet connection)
2	Telephone antennas for mobile phone	6	Telephone signal: mobile phone; metal color connector; Bordeaux violet coding connector
3	GPS antenna	7	GPS signal (blue color connector)
4	SDARS antenna for satellite reception	8	Telephone signal: TCU; metal color connector; grey color coding connector

SDARS Satellite Tuner

The SDARS (Satellite Digital Audio Radio Service) control unit enables reception of digital radio signals.

Digital transmissions are superior in quality to analog transmissions. The radio stations of the satellite tuner can be selected under the “Satellite radio” submenu.

Advantages of digital satellite radio:

- Reception of same radio station across the entire US mainland (excluding Alaska).
- Digital reception of music, news and talk stations.
- Wide choice of available music genres.
- No commercial breaks.
- Digital signal transmission provides greater immunity to external interference.

SDARS control unit



Index	Explanation	Index	Explanation
1	MOST	3	SDARS signal (pink connector)
2	Power supply		

The satellite tuner is designed for the Sirius Satellite Radio subscription service. The SDARS signals are transmitted by three satellites. In areas without coverage, the SDARS signals are beamed terrestrially.

Both SDARS signals (satellite and terrestrial) are received by a single antenna in the roof antenna assembly and supplied to the SDARS control unit.

The SDARS satellite tuner is located in the luggage compartment on the left-hand side.

When the system is activated for the first time, the weather channel (channel 184) is available for 360 days free of charge for test purposes.

The other channels are blocked by the provider Sirius (not yet subscribed) and therefore still show a credit card symbol.



Blocked SDARS channels

If a channel that is not yet subscribed is selected, the request to register with the provider Sirius with the ESN number of the SDARS module will be shown.



Request to contact the service provider

Important information for enabling SDARS:

- Park vehicle with clear view of the sky; tune in to weather channel on channel 184 (The weather channel is enabled for 360 days)
- Call SIRIUS and apply to enable the SDARS module
- The radio is muted and the “Updating list...” information appears during activation



Search of SDARS station list

- Wait until the pop-up disappears and the radio can be heard again
- Check that a credit card symbol no longer appears next to the enabled channels (see picture below). Otherwise, repeat the previous steps.

After successfully enabling the channels, on selection, the diskette symbol appears to the right next to the station. It indicates that the station can now be stored in the “All channels” list.



SDARS successfully enabled

The ESN number is always shown in the "Options menu" of the satellite radio.



ESN number

External Audio Sources

DVD Changer

The 6-DVD changer is offered as part of the ZPS Premium Sound Package on the F01/F02 and it is located above the glove compartment behind the dashboard trim panel. A CD Changer is no longer offered.

The DVD changer forms part of the MOST network.

A single-slot changer means that the DVDs or CDs are loaded in the unit individually without a magazine.

A DVD can be loaded by pressing the Load button, followed by the button for the DVD tray into which the DVD is to be inserted.

If no button is pressed after the Load button has been tapped, the LED in the tray button for the first empty tray flashes. The tray moves into position during this time. Once tray positioning is completed, the status display begins to flash and the DVD can be loaded.



DVD Changer

Index	Explanation	Index	Explanation
1	Buttons for DVD trays with status indicator	5	DVD drive eject button
2	Load button for DVD drive	6	MOST
3	Slot lighting	7	Power supply
4	Slot for DVD player		

The DVD directory is read directly after loading. The contents of the DVD have to be read before the next DVD can be inserted by pressing the Load button again followed by the button for the DVD tray.

The quick-load function must be activated in order to load all DVDs one after the other.

The Load button must be pressed for approximately 2 seconds for this purpose. The LEDs in the tray buttons for trays that are empty begin to flash.

Up to six DVDs can be inserted one after the other, depending on the number of empty trays. The contents of the DVDs inserted are read either once the final empty tray is occupied, after a timeout period or if the Load or Eject button is pressed.

The shutter must be open in order to insert the DVDs. The slot lighting flashes when it is possible to insert a disk. Operation is described in detail in the Owner's Handbook for the vehicle.

An individual DVD can be ejected by pressing the Eject button followed by the operating button concerned. Pressing and holding the Eject button ejects all the DVDs immediately one after the other.

Supported compressed audio formats:

- MPEG-1 Layer 3 Audio (MP3) with ID3 tag version 1 and version 2
- Windows Media Audio (WMA) up to version 9 with WMA tags
- Advanced Audio Coding (AAC)

Audio formats that are protected by Digital Rights Management (DRM) cannot be played.

The data on the DVDs is decoded by the DVD changer and converted into digital MOST signals (audio) or analog CVBS picture signals (video).

If the vehicle is equipped with the HiFi speaker system, the digital data on the DVD is sent to the head unit through the MOST. Here it is converted to analog data and output through the HiFi amplifier and the speakers.

If the Top-HiFi system option is installed, the decoded audio data is sent directly to the Top-HiFi amplifier through the MOST.

This direct transmission bypassing the head unit is made possible because data conversion and sound adjustment take place exclusively in the Top-HiFi amplifier.

The analog CVBS (Composite Video Baseland Signal) video signals are sent directly through the CVBS link to the CIC.

In come cases (depending on equipment options installed) all three CIC CVBS inputs are already occupied and the video signals are distributed through a video switch (see video switch section in this training material for further information).

The DVD changer is located above the glove compartment, concealed behind the interior trim equipped with a flap mechanism.

The following picture shows the location of the DVD changer with the interior trim open.



Single-slot DVD changer is located behind dashboard trim panel above the glove compartment

USB/Audio Interface

The “USB/audio interface” supports the playback of audio files stored on mass storage devices with USB connections such as USB sticks, MP3 players etc.

USB is a serial bus system that allows fast and simple connection of terminal devices to computer systems.

The mass storage medium can be found under the “External devices” submenu in the “CD/Multimedia” menu of the iDrive.



Activation of an external USB/audio interface in the center console

All USB mass storage devices that support the “USB Mass Storage Class” standard can be connected. This includes mass storage media for the playback of compressed audio files with a USB interface such as MP3 players, USB memory sticks, etc. The Apple iPod® is also supported as from the 4th generation version.

Due to the large number of devices on the market, no guarantee can be given that every available “USB Mass Storage Class” device will function through the USB interface. If a device of a different device class is connected, the message “Incompatible device” will appear.

When a USB mass storage device is connected, the contents of the device are read and the folder structure is processed for display on the CID. A plausibility check is performed as to whether the tracks can be played by the vehicle’s sound system.

Only those tracks that can be played are displayed.

While the database of the content (details of the music tracks is constructed, the music files can only be selected by navigating through the folder structure. On completion of the database, music tracks can also be selected by genre, artist and album.

Media Transfer Protocol (MTP) is currently not supported. MP3 players that use MTP are therefore not supported. More information on the protocols used can be obtained from the operating instructions of the mass storage device.

WARNING!!!

With certain mobile phones, Bluetooth is deactivated if they are connected to the vehicle through the USB interface.

Note: It is not recommended to use mobile phones via the USB interface in the center console (Option 6FL). The Smartphone Integration Option 6NF is better suited for this purpose and is described in the following pages.

The following compressed file formats are normally supported with fixed and variable bit rates:

- MP3 (MPEG-1 Audio Layer 3) with ID3 tags Version 2
- Windows Media Audio (WMA) with WMA tags
- Advanced Audio Coding (AAC)

The WAV file format is also supported. USB mass storage devices must be formatted using the FAT file system. If more than one partition (logical drive) has been set up on the device, only the first partition is supported.

The USB mass storage device cannot be accessed if the files are password-protected or are subject to Digital Rights Management (DRM).

■ iPod® Connection

When music tracks are to be played back using the Apple iPod® the iPod must be connected through an adaptor cable that simultaneously uses the auxiliary jack socket and the USB.

The y-cable (cable adapter for iPod®; BMW part number 61 12 0 429 645) included with the vehicle.

With the adaptor cable, the USB connection is used to control the iPod® and the jack socket for audio playback.

The reason for this method of connection is that music tracks obtained from iTunes® (Apple music portal) are subject to DRM and can only be played on the device to which they were downloaded. The copyright protection prevents digital transmission of the music track via USB.

If a video file is selected on the iPod®, only the sound track is played. If other supported USB mass storage devices are used, video files are not displayed.

It is only possible to access the files on the mass storage device using the iDrive when the USB mass storage device is connected to the USB interface. If the mass storage device is connected using the Audio jack plug, the iDrive cannot be used to operate the device.

AUX-in connection (USB/jack 3.5 mm) of option 6FL in the center console of the F01/F02



Note: USB hard drives must not be connected to the USB interface due to their high power draw. It is not permissible for hard disks to draw their power supply from the vehicle's electrical system (e.g. from the cigarette lighter socket) and can cause faults.

■ “USB/audio interface” Components

“USB/audio interface” consists of the following components:

- Interface box High (ULF-SBX-High)
- USB hub
- Audio socket with USB interface
- Application software in the head unit

The USB interface is on the center console and is protected by a sliding cover.

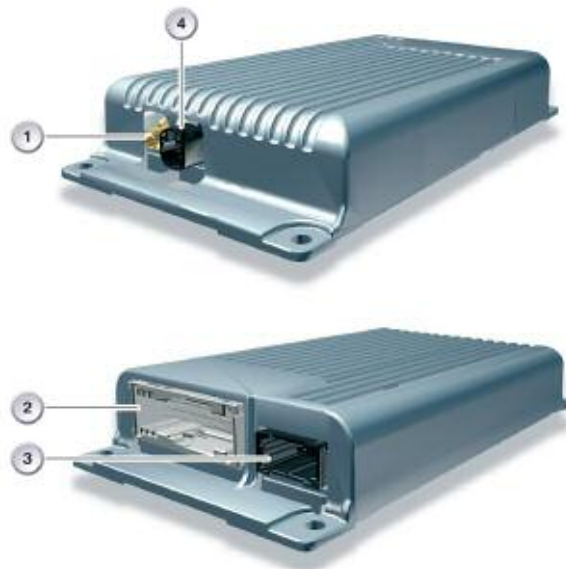
Simultaneous use of the USB interface and the 12 V socket for charging the mass storage device is not recommended.

Depending on the USB lead used, the mass storage device may be able to be charged through the USB interface. However, the power consumption of the mass storage device must not exceed the maximum level of 500 mA permitted by the SBX High.

The (SBX High) interface box is capable of performing the following tasks:

- USB connection for USB/audio interface
- Bluetooth interface with hands-free mode and phone book
- Basic voice input and activation system through the telephone

ULF-SBX High connections



Index	Explanation	Index	Explanation
1	Bluetooth connection (Not in US)	3	MOST connection
2	54-pin connector	4	USB connection

The ULF-SBX High interface box is always fitted if the “USB/audio interface” is fitted to the vehicle.

Although both the ULF-SBX-H and the TCU may be fitted in a vehicle at the same time, the TCU always provides the telephone functions. The telephone functions are not available in the ULF-SBX High and the module is only installed to provide the "USB audio interface" option.

The (TCU) and the (ULF-SBX-H) interface box control units are connected to the MOST bus.

The ULF-SBX-H decodes the digital audio signals collected through the USB interface. The audio files are then broadcast through the MOST.

The analog LF (low frequency) signals from the audio socket are also broadcast on the MOST.

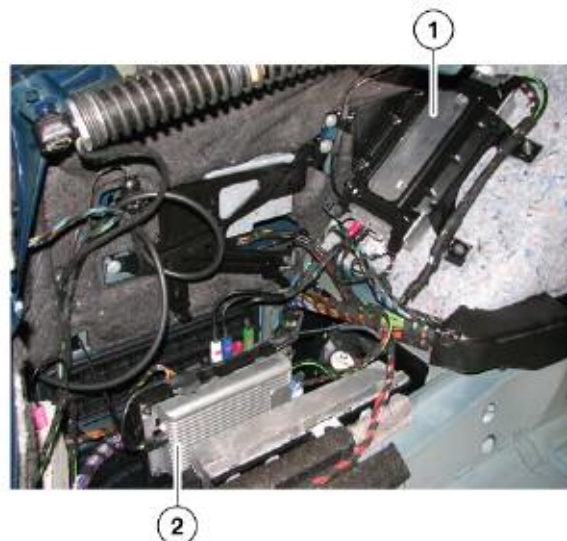
The audio signal is transmitted digitally on the MOST bus to the HiFi amplifier and the amplifier distributes this signal to all the vehicle’s speakers.

The ULF-SBX High supports USB 1.1 with the following technical data:

- Maximum data rate: 12 Mbit/s
- Voltage: 5 V
- Current: 500 mA

The ULF-SBX High is located in the luggage compartment on the left-hand side.

Location of interface box (ULF-SBX-High) on rear left in luggage compartment of F01/F02



Index	Explanation	Index	Explanation
1	Telematics control unit (TCU)	2	Interface box (ULF-SBX-High)

USB Hub

The USB hub allows multiple USB interfaces to be connected to the ULF-SBX High.

The USB hub incorporates an active USB signal amplifier and is equipped with two USB inputs and one USB output.

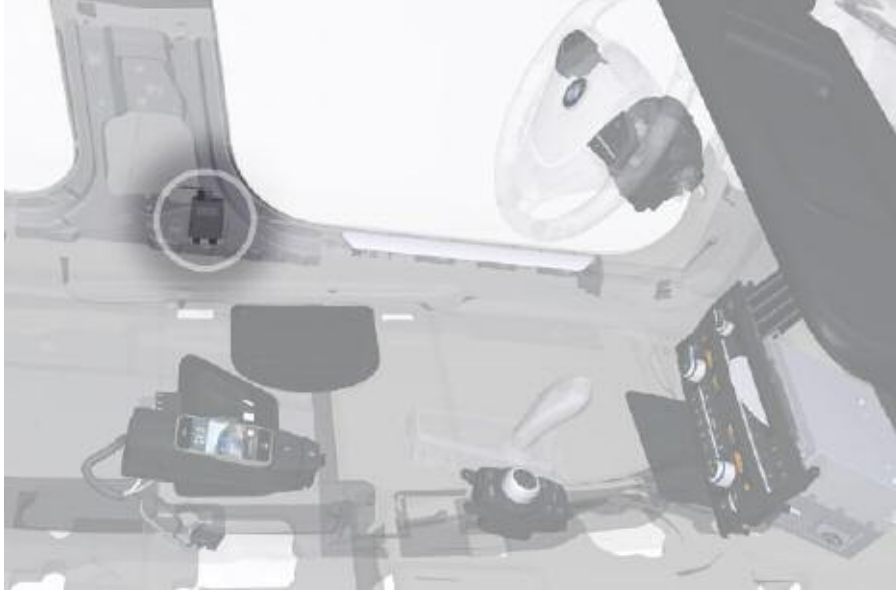
USB Hub connections



Index	Explanation	Index	Explanation
1	USB connection to AUX-in connection (blue connector)	3	USB connection to (ULF-SBX-High) interface box (black connector)
2	USB connection for base plate of the Smartphone audio line (neutral color connector)	4	Power supply for the USB hub (black connector)

Note: The USB hub is only used if the vehicle has the Smartphone Integration option.

The USB hub on the F01/F02 is installed behind the trim panel for the left-hand B-pillar. It is installed in the same place on both right-hand drive and left-hand drive vehicles.



Location of USB hub at left-hand B-pillar

Audio Jack

The audio jack is used for connecting an external audio source such as an MP3, cassette or CD player using a 3.5 mm jack plug.

The AUX-In connection without USB interface is standard equipment on the F01/F02. It is located below the Center armrest. A plug, 12 V power socket is located in the immediate vicinity of the audio socket.

Smartphone Integration

It is now possible to connect to and play back (through the iDrive system) music tracks stored in a mobile phone. Currently, only the iPhone may be integrated in the vehicle network by means of the Smartphone Integration audio link.

Smartphones may be connected through the USB Y cable or through the installation of a Smartphone integration snap in cradle adapter, available as option 6NF.

The audio files can be selected and played from the submenu "External devices" in the "CD/Multimedia" iDrive menu

This feature works independently from the iPod/USB interface.

The new AUX-In connection features an internal switch function to accommodate both the USB interface and the Smartphone integration options.

It is possible to select audio from the snap in cradle or, switch to an external audio device connected to the (AUX) audio jack or Y-cable to the ULF-SBX-High. The second switch position is triggered by inserting a plug in the (AUX) jack.

The electronic control module is installed in the base plate of the phone cradle. The link to the USB hub and AUX-In connection are already integrated in the vehicle wiring harness.



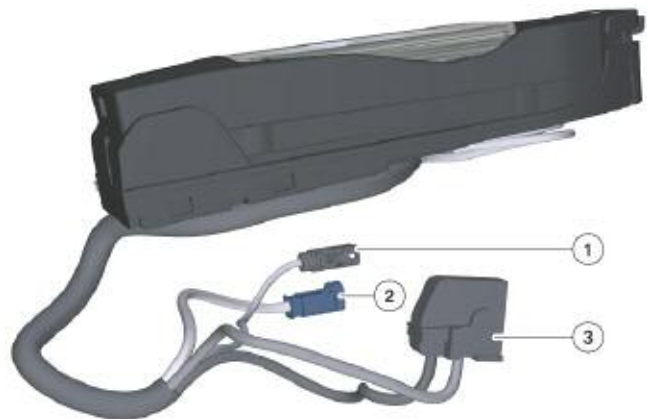
Smartphone - iPhone with matching snap-in adapter



iPhone with snap-in cradle adapter on the base plate for Smartphone Integration

The following illustration shows the arrangement of the individual components on the base plate for the Smartphone Integration.

Index	Explanation
1	Base plate connection to roof antenna (black connection)
2	USB connection from base plate to USB hub (blue connector)
3	18-pin plug connector: (power supply, cradle-on, AUX-AF signals)



Audio Data Control Line

The audio data of the snapped in cradle adapter for the mobile phone is controlled by a four-core USB data cable.

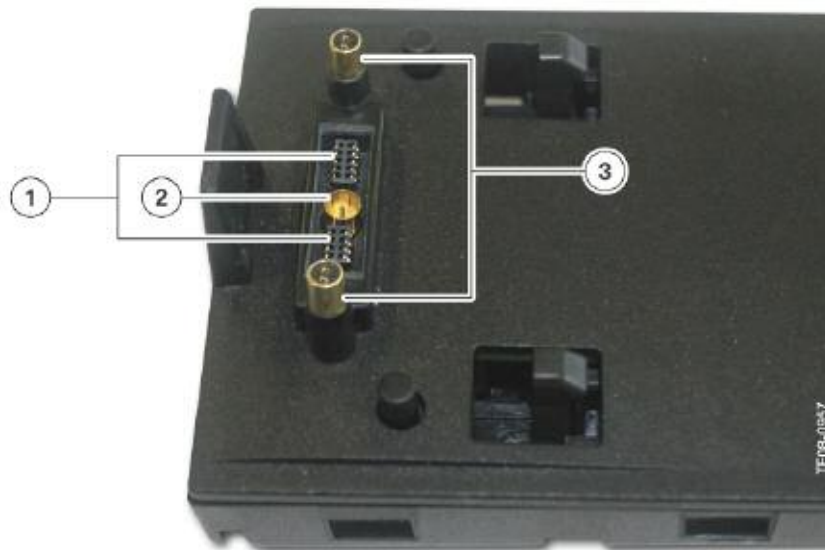
The base plate and cradle specifically developed for the Smartphone Integration option (6NF) is immediately recognizable by the two gold-plated pin connectors.

These two gold-plated pin connectors are also used as lock pins for the snap-in cradle adapter.

Plastic pins are used in the same position in the standard snap-in telephone cradle adapters.

In this way it is possible to distinguish at a glance whether the correct base plate is installed for the Smartphone Integration option.

Base plate for Smartphone Integration



Index	Explanation	Index	Explanation
1	18-pin plug connector of base plate (power supply, cradle-on, AUX-AF signals)	3	USB connection: Distribution of the USB supply voltage and data lines over two gold-plated pin housings with shielding
2	Antennal connection to roof antenna		

Service Information

Unlocking the Service Menu Option

Several important functions can be checked directly at the CIC with the aid of the Service menu. This menu can be used to select and adjust settings that are not visible for the customer.

The procedure for starting the Service menu with the "safe grip" has changed compared to the CCC system:

- Call up Start menu
- Push controller in forward direction for at least 10 s
- Controller 3 notches to the right
- Controller 3 notches to the left
- Controller 1 notch to the right
- Controller 1 notch to the left
- Controller 1 notch to the right
- Press controller once
- The "Service menu" is now added as the last submenu to Settings

Four selection menus are available in the Service menu of the CIC:

- Navigation
- Telephone and BMW Service
- TV (Not for US)
- Gracenote®



Service menu hidden



Service menu "unlocked"

Note: Although it appears in the Service menu, TV is not available on US vehicles.

Navigation



CIC Service menu with Navigation item selected.

Navigation	Screen content (example)	Explanation
GPS		
GPS	Status Latitude: 12°34'56"N	GPS position data
GPS	Tracking 01: 03 14,3, 02 xx, yy, z	GPS satellites
GPS	Version Receiver SW Version/Date	Software version and date of manufacture of GPS receiver
Sensor test	Wheel sensors, GPS satellites, Gyro	Check of input signals
Map version	Map Database: 1.067	Map version number Database: 1.067
Location entry	Location Entry: Entry	Loop same as destination entry
Voice output test		

Note: Although it appears in the Service menu, TV is not available on US vehicles.

Telephone and BMW Service



CIC Service menu with Telephone and BMW Service selected

Telephone	Screen content (example)	Explanation
BT Name	BMW 57502	Bluetooth name of BMW vehicle for pairing
NAD	51 dBm	GSM signal level of built-in telephone module
MCC/MNC	262 01	Mobile Country Code + Mobile Network Code; unique code for country and network provider with which the phone is currently registered.
ICC ID	89490200000537151529	Integrated Circuit identifier = Identifier of SIM card
IMEI	351231004373763	International Mobile Equipment Identity (IMEI) is a unique 15-digit serial number of the telephone transceiver
Registration status	Registered	Registered = SIM card enabled and logged into network; Not registered = SIM card enabled but currently no
Reception		
Signal strength	20/100	Relative signal strength of the built-in telephone module in percent (max 100 %)
GPS T/D	14:41:57 27.05.2008	Assist cannot be enabled if time and date are incorrect

Note: Although it appears in the Service menu, TV is not available on US vehicles.

TV



Screen Shot of the TV Sub-menu in the Service Menu

There are five sub-menus which can be selected under the TV sub-menu:

- Ch = channel currently tuned in
- Frequency in MHz
- Channel information (transmission standard, bandwidth and program name)
- DVB-T parameter (modulation type, analog, digital TV distinction)
- Antenna information (field strength in **dB μ V** (Decibel micro Volt)

Note: Although it appears in the Service menu, TV is not available on US vehicles.

Gracernote®



The sub-menu for Gracernote under the Service menu

The music track database can be updated under the menu item Gracernote.

Once the update CD has been loaded in the CIC drive, it is possible to compare the currently installed data status with the data status of the CD in the Service menu selection (See illustration below).

If the CD corresponds to the current status, the latest version of the Gracernote® music track database is downloaded after selecting "Start installation". The previous version is overwritten.

No data is added to unrecognized music tracks. The update only serves the purpose of identifying music tracks in connection with future music data storage converted with the aid of the rip function.



The sub-menu for Gracernote/Start installation under the Service menu

Resetting the CIC

The Car Information Computer can be reset by pressing the rotary push button (ON button) for 25 seconds. After 25 seconds, the control display becomes blank as a confirmation that the CIC is being restarted.



CIC Start Screen After a Successful Reset

Note: When resetting the MOST control unit, the MOST gateway is muted for 2 seconds.

Programming

Programming the CIC is done with the use of the respective optical testing and programming interface modules.

The interface modules OP(P)S or ICOM (A+B) are simultaneously connected to the OBD interface and to the MOST interface of the vehicle.